

# QUARTERLY ECONOMIC COMMENTARY

Summer 2008

**ALAN BARRETT  
IDE KEARNEY  
MARTIN O'BRIEN**

*The forecasts in this Commentary are based  
on data available by end-May 2008*

## **Special Article**

**Ireland's Innovation Performance: 1991 to 2005**

by

Nola Hewitt-Dundas and Stephen Roper

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The *Commentary* and Article contained within have been accepted for publication by the Institute, which is not responsible for either the content or the views expressed. Draft completed 19 June 2008.

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As part of the remit of the *Quarterly Economic Commentary*, articles on various aspects of the Irish economy and Irish economic policy are regularly published along with the forecasts and commentary. Authors are invited to submit papers for consideration to either of the *QEC*'s co-editors, Alan Barrett and Ide Kearney at: ESRI, Whitaker Square, Sir John Rogerson's Quay, Dublin 2 (e-mail [Alan.Barrett@esri.ie](mailto:Alan.Barrett@esri.ie) or [I.Kearney@planet.nl](mailto:I.Kearney@planet.nl)). The following guidelines should be followed:

All articles should be up-to-date and policy-oriented. The content should involve the application of economic theory, data analysis or the application of lessons from the international literature. Review articles are also welcome where lessons for policy are explicitly addressed. Articles should normally comprise 4-10,000 words, excluding tables. All articles will be anonymously refereed by members of the editorial board or by an external referee chosen by the editors. The editors may also, where appropriate, seek the comments of policy experts outside of the academic community.

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# CONTENTS

*Page*

## ECONOMIC COMMENTARY

Alan Barrett, Ide Kearney and Martin O'Brien

SUMMARY	1
Forecast National Accounts	2
The International Economy	5
The Domestic Economy	12
General Assessment	42

## SPECIAL ARTICLE

<b>Ireland's Innovation Performance: 1991 to 2005</b>	46
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Nola Hewitt-Dundas and Stephen Roper

# SUMMARY TABLE

	2006	2007	2008	2009
<b>OUTPUT</b>				
(Real Annual Growth %)				
Private Consumer Expenditure	5.7	5.4	1.0	2.0
Public Net Current Expenditure	5.3	6.7	4.0	2.0
Investment	3.1	0.2	-14.9	-4.5
Exports	4.4	8.2	4.8	4.4
Imports	4.4	6.4	2.7	3.0
Gross Domestic Product (GDP)	5.7	5.3	-0.4	2.0
Gross National Product (GNP)	6.5	4.5	-0.4	1.9
GNP per capita (constant prices)	3.8	2.2	-1.9	1.5
<b>PRICES</b>				
(Annual Growth %)				
Harmonised Index of Consumer Prices (HICP)	2.7	2.8	3.5	2.7
Consumer Price Index (CPI)	4.0	4.9	4.5	3.0
Wage Growth	4.8	5.5	4.0	3.5
<b>LABOUR MARKET</b>				
Employment Levels (ILO basis (000s))	2,044	2,117	2,116	2,103
Unemployment Levels (ILO basis (000s))	95	100	136	160
Unemployment Rate (as % of Labour Force)	4.4	4.5	6.0	7.1
<b>PUBLIC FINANCE</b>				
Exchequer Balance (€m)	2,264	-1,619	-8,208	-10,824
General Government Balance (€m)	5,214	555	-5,187	-7,410
General Government Balance (% of GDP)	3.0	0.3	-2.8	-3.9
General Government Debt (% of GDP)	25.1	25.4	29.8	34.5
<b>EXTERNAL TRADE</b>				
Balance of Payments Current Account (€m)	-7,271.0	-9,390.6	-8,833.1	-8,538.6
Current Account (% of GNP)	-4.9	-5.9	-5.6	-5.2
<b>EXCHANGE AND INTEREST RATES (end of year)</b>				
US\$/€ Exchange Rate	1.32	1.43	1.55	1.55
STG£/€ Exchange Rate	0.67	0.70	0.79	0.79
Main ECB Interest Rate	3.50	4.00	4.25	4.25



# SUMMARY

The recent trend of downward revisions to our previous forecasts continues in this *Commentary* in the light of emerging data. The downward revisions this time are such that we are now forecasting a contraction in the economy in 2008, with both GNP and GDP falling by 0.4 per cent in real terms. Thus Ireland will experience a recession for the first time since 1983. For 2009, we expect an upturn with real GNP expected to grow by 1.9 per cent and real GDP expected to grow by 2 per cent.

We now expect consumption to grow by just 1 per cent this year and by 2 per cent next year. These figures represent significant downward revisions from our last *Commentary*. We anticipate a decline in investment of almost 15 per cent in 2008 and of 4.5 per cent in 2009. We expect exports to grow by 4.8 per cent in 2008 and by 4.4 per cent in 2009, well down on the 2007 preliminary growth figure of 8.2 per cent.

The downward revisions to the export forecasts are partly related to a downward revision in forecasts for many of the world's major economies. For example, it is now expected that the US will experience a technical recession this year, meaning two quarters of negative growth. The factors underlying this subdued performance include the credit crunch and high inflation as a result of increasing commodity prices.

The dramatic slowdown in the economy will have many implications. The deficit on the public finances is forecast to grow rapidly. On a general government basis, we now expect a deficit of 2.8 per cent of GDP in 2008 and of 3.9 per cent in 2009 in the absence of budgetary intervention. We expect job losses to be a feature of the economy in 2008 and for the rate of unemployment to rise to over 7 per cent by the end of 2008. Job gains should resume in 2009 although the rate of job losses in 2008 will be such that the numbers employed on average in 2009 will be lower than that of 2007 and 2008.

On inflation, we expect the *Consumer Price Index* (CPI) to average 4.5 per cent in 2008 and 3 per cent in 2009. This forecast is based partly on an expectation of more stable commodity prices in 2009. In an analysis on the extent to which the strengthening euro could offset some of the inflationary pressures currently facing the economy, we find some evidence to suggest that recent consumer price developments are not fully reflecting the deflationary benefits of a stronger euro as may be expected. With nominal wage growth of 4 per cent in 2008 and 3.5 per cent in 2009, real wage growth will generally be depressed over the forecast period. This is in line with the weakening labour market. A further consequence of the weakening labour market will be the resumption of net outward migration in 2009, with a net outflow of 20,000 foreseen.

In the *General Assessment*, we discuss how the government might react to the likelihood of the 3 per cent deficit limit under the Stability and Growth Pact being breached. We argue that once a medium-term strategy is in place to restore the public finances to balance, facilitating the potential for growth identified in the *Medium-Term Review*, no disruptive action should be taken in Budget 2009 simply to bring the deficit under 3 per cent next year. We also discuss how the emerging situation in the labour market will have implications for the focus of state agencies in education and training as they move to ensure that rising unemployment does not become a problem of long-term unemployment.

## NATIONAL ACCOUNTS 2007 (Estimate)

### A: Expenditure on Gross National Product

	2006 €m	2007 Estimate €m	Change in 2007				
			€m		%		
			Value	Volume	Value	Price	Volume
Private Consumer Expenditure	82,483	90,270	7,787	4,494	9.4	3.8	5.4
Public Net Current Expenditure	24,939	27,731	2,792	1,661	11.2	4.2	6.7
Gross Fixed Capital Formation	46,027	47,022	995	70	2.2	2.0	0.2
Exports of Goods and Services (X)	139,766	150,546	10,780	11,428	7.7	-0.4	8.2
Physical Changes in Stocks	1,476	-86	-1,562	-1,624			
<b>Final Demand</b>	<b>294,691</b>	<b>315,483</b>	<b>20,792</b>	<b>16,242</b>	<b>7.1</b>	<b>1.5</b>	<b>5.5</b>
less:							
Imports of Goods and Services (M)	120,997	130,771	9,774	7,686	8.1	1.6	6.4
less:							
Statistical Discrepancy	-1,011	-1,074	-63	-639			
<b>GDP at Market Prices</b>	<b>174,705</b>	<b>185,786</b>	<b>11,081</b>	<b>9,195</b>	<b>6.3</b>	<b>1.0</b>	<b>5.3</b>
less:							
Net Factor Payments (F)	-25,575	-27,888	-2,313	-2,349	9.0	-0.1	9.2
<b>GNP at Market Prices</b>	<b>149,130</b>	<b>157,898</b>	<b>8,769</b>	<b>6,785</b>	<b>5.9</b>	<b>1.3</b>	<b>4.5</b>

### B: Gross National Product by Origin

	2006 €m	2007 Estimate €m	Change in 2007	
			€m	%
Agriculture, Forestry, Fishing	3,195	3,003	-192	-6.0
Non-Agricultural: Wages, etc.	72,426	79,312	6,886	9.5
Other:	59,649	62,226	2,577	4.3
Adjustments: Stock Appreciation	-329	-200		
Statistical Discrepancy	-1,011	-1,074		
<b>Net Domestic Product</b>	<b>133,931</b>	<b>143,268</b>	<b>9,337</b>	<b>7.0</b>
less:				
Net Factor Payments	-25,575	-27,888	-2,313	9.0
<b>National Income</b>	<b>108,356</b>	<b>115,380</b>	<b>7,024</b>	<b>6.5</b>
Depreciation	18,436	19,631	1,195	6.5
<b>GNP at Factor Cost</b>	<b>126,792</b>	<b>135,011</b>	<b>8,219</b>	<b>6.5</b>
Taxes less Subsidies	22,338	22,888	550	2.5
<b>GNP at Market Prices</b>	<b>149,130</b>	<b>157,898</b>	<b>8,769</b>	<b>5.9</b>

### C: Balance of Payments on Current Account

	2006 €m	2007 Estimate €m	Change in 2007	
			€m	%
Exports (X) less Imports (M)	18,769	19,775	1,006	
Net Factor Payments (F)	-25,575	-27,888	-2,313	
Net Transfers	-465	-1,278	-813	
<b>Balance on Current Account</b>	<b>-7,271</b>	<b>-9,391</b>	<b>-2,120</b>	
as % of GNP	-4.9	-5.9	-1.1	

### D: GNDI and Terms of Trade

	2006 €m	2007 Estimate €m	2007 Volume Change	
			€m	%
Terms of Trade Loss or Gain		-3,052		
GNP Adjusted for Terms of Trade	149,130	152,863	3,733	2.5
GNDI*	148,665	151,606	2,941	2.0
National Resources**	148,888	151,645	2,757	1.9

\* GNDI is GDP adjusted for terms of trade and net international transfers.

\*\* GNDI including capital transfers.

## FORECAST NATIONAL ACCOUNTS 2008

### A: Expenditure on Gross National Product

	2007 Estimate €m	2008 Forecast €m	Change in 2008				
			€m		%		
			Value	Volume	Value	Price	Volume
Private Consumer Expenditure	90,270	94,090	3,820	903	4.2	3.2	1.0
Public Net Current Expenditure	27,731	30,365	2,634	1,109	9.5	5.3	4.0
Gross Fixed Capital Formation	47,022	39,935	-7,087	-7,008	-15.1	-0.2	-14.9
Exports of Goods and Services (X)	150,546	157,251	6,705	7,289	4.5	-0.4	4.8
Physical Changes in Stocks	-86	-69	17	0			
<b>Final Demand</b>	<b>315,483</b>	<b>321,572</b>	<b>6,089</b>	<b>2,763</b>	<b>1.9</b>	<b>1.0</b>	<b>0.9</b>
less:							
Imports of Goods and Services (M)	130,771	136,679	5,909	3,496	4.5	1.8	2.7
less:							
Statistical Discrepancy	-1,074	-1,074	0	-36			
<b>GDP at Market Prices</b>	<b>185,786</b>	<b>185,967</b>	<b>181</b>	<b>-697</b>	<b>0.1</b>	<b>0.5</b>	<b>-0.4</b>
less:							
Net Factor Payments (F)	-27,888	-28,126	-238	40	0.9	1.0	-0.1
<b>GNP at Market Prices</b>	<b>157,898</b>	<b>157,841</b>	<b>-58</b>	<b>-660</b>	<b>0.0</b>	<b>0.4</b>	<b>-0.4</b>

### B: Gross National Product by Origin

	2007 Estimate €m	2008 Forecast €m	Change in 2008	
			€m	%
Agriculture, Forestry, Fishing	3,003	3,063	60	2.0
Non-Agricultural: Wages, etc.	79,312	82,427	3,115	3.9
Other:	62,226	59,435	-2,791	-4.5
Adjustments: Stock Appreciation	-200	-200		
Statistical Discrepancy	-1,074	-1,074		
<b>Net Domestic Product</b>	<b>143,268</b>	<b>143,651</b>	<b>383</b>	<b>0.3</b>
less:				
Net Factor Payments	-27,888	-28,126	-238	0.9
<b>National Income</b>	<b>115,380</b>	<b>115,525</b>	<b>145</b>	<b>0.1</b>
Depreciation	19,631	19,915	285	1.5
<b>GNP at Factor Cost</b>	<b>135,011</b>	<b>135,441</b>	<b>430</b>	<b>0.3</b>
Taxes less Subsidies	22,888	22,400	-488	-2.1
<b>GNP at Market Prices</b>	<b>157,898</b>	<b>157,841</b>	<b>-58</b>	<b>0.0</b>

### C: Balance of Payments on Current Account

	2007 Estimate €m	2008 Forecast €m	Change in 2008	
			€m	%
Exports (X) less Imports (M)	19,775	20,571	796	
Net Factor Payments (F)	-27,888	-28,126	-238	
Net Transfers	-1,278	-1,278	0	
<b>Balance on Current Account</b>	<b>-9,391</b>	<b>-8,833</b>	<b>558</b>	
as % of GNP	-5.9	-5.6	0.4	

### D: GNDI and Terms of Trade

	2007 €m	2008 Estimate €m	2008 Volume Change	
			€m	%
Terms of Trade Loss or Gain		-3,360		
GNP Adjusted for Terms of Trade	157,898	153,879	-4,020	-2.5
GNDI*	156,620	152,623	-3,997	-2.6
National Resources**	156,659	152,923	-3,736	-2.4

\* GNDI is GDP adjusted for terms of trade and net international transfers.

\*\* GNDI including capital transfers.



## FORECAST NATIONAL ACCOUNTS 2009

### A: Expenditure on Gross National Product

	2008 Forecast €m	2009 Forecast €m	Change in 2009				
			Value €m	Volume	Value	% Price	Volume
Private Consumer Expenditure	94,090	97,700	3,609	1,882	3.8	1.8	2.0
Public Net Current Expenditure	30,365	32,491	2,126	607	7.0	4.9	2.0
Gross Fixed Capital Formation	39,935	38,953	-982	-1,796	-2.5	2.1	-4.5
Exports of Goods and Services (X)	157,251	165,148	7,897	6,896	5.0	0.6	4.4
Physical Changes in Stocks	-69	-55	14	0			
<b>Final Demand</b>	<b>321,572</b>	<b>334,236</b>	<b>12,663</b>	<b>7,854</b>	<b>3.9</b>	<b>1.5</b>	<b>2.4</b>
less:							
Imports of Goods and Services (M)	136,679	143,191	6,511	4,072	4.8	1.7	3.0
less:							
Statistical Discrepancy	-1,074	-1,074	0	-24			
<b>GDP at Market Prices</b>	<b>185,967</b>	<b>192,119</b>	<b>6,152</b>	<b>3,806</b>	<b>3.3</b>	<b>1.2</b>	<b>2.0</b>
less:							
Net Factor Payments (F)	-28,126	-29,217	-1,091	-802	3.9	1.0	2.9
<b>GNP at Market Prices</b>	<b>157,841</b>	<b>162,901</b>	<b>5,061</b>	<b>2,989</b>	<b>3.2</b>	<b>1.3</b>	<b>1.9</b>

### B: Gross National Product by Origin

	2008 Forecast €m	2009 Forecast €m	Change in 2009	
			€m	%
Agriculture, Forestry, Fishing	3,063	3,125	61	2.0
Non-Agricultural: Wages, etc.	82,427	84,785	2,358	2.9
Other:	59,435	61,571	2,136	3.6
Adjustments: Stock Appreciation	-200	-200		
Statistical ..				
Discrepancy	<b>-1,074</b>	<b>-1,074</b>		
<b>Net Domestic Product</b>	<b>143,651</b>	<b>148,207</b>	<b>149,281</b>	<b>-13,899.5</b>
less:				
Net Factor Payments	-28,126	-29,217	-172,869	-120.3
<b>National Income</b>	<b>115,525</b>	<b>118,989</b>	<b>147,116</b>	<b>-523.1</b>
Depreciation	19,915	20,659	-94,866	-82.1
GNP at Factor Cost	135,441	139,648	119,733	601.2
Taxes less Subsidies	22,400	23,253	-112,188	-82.8
<b>GNP at Market Prices</b>	<b>157,841</b>	<b>162,901</b>	<b>140,501</b>	<b>627.2</b>

### C: Balance of Payments on Current Account

	2008	2009	Change in 2009
	Estimate €m	Forecast €m	€m
Exports (X) less Imports (M)	20,571	21,957	1,386
Net Factor Payments (F)	-28,126	-29,217	-1,091
Net Transfers	-1,278	-1,278	0
<b>Balance on Current Account</b>	<b>-8,833</b>	<b>-8,539</b>	<b>294</b>
as % of GNP	-5.6	-5.2	0.4

### D: GNDI and Terms of Trade

	2008	2009	2009 Volume Change	
	€m	Estimate €m	€m	%
Terms of Trade Loss or Gain		-1,812		
GNP Adjusted for Terms of Trade	157,841	159,017	1,176	0.7
GNDI*	156,563	157,761	1,198	0.8
National Resources**	156,863	158,061	1,198	0.8

\* GNDI is GDP adjusted for terms of trade and net international transfers.

\*\* GNDI including capital transfers.

# INTERNATIONAL ECONOMY<sup>1</sup>

A number of factors are currently impacting on many of the world's economies, all of which will be negative for growth. These factors include the following:

- The on-going fall-out from the credit crisis as evident in the elevated spreads between official and market interest rates is leading to restrictions on credit availability;
- House prices are declining in a number of countries, including the US and the UK, and house-building is also contracting;
- Commodity prices continue to rise with oil trading around \$135 per barrel on occasions in recent weeks.

At a general level, the OECD sees these factors leading to a slowdown in economic activity in its member states through the course of 2008, with a recovery occurring in 2009.

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## Euro Area

Economic activity in the Euro Area is expected to slow in 2008 despite apparent resilience in the early part of the year in the face of the global credit crisis. The OECD now expects real GDP to grow by 1.7 per cent in 2008 and by 1.4 per cent in 2009, down from the 2007 figure of 2.6 per cent. This slower pace of growth will result partly from a decline in residential construction – a contraction of 2.2 per cent is expected in 2008, followed by a further contraction of 2 per cent in 2009. Net exports are expected to make only a minor contribution to growth in 2008, with growth of just 0.2 per cent forecast. For 2009, the corresponding figure for net exports is expected to be zero. These forecasts are based in part on slower world demand and a high value of the euro. With regard to the latter, it is important to note that the euro traded at \$1.34 in mid-2007; it is now \$1.54. The corresponding figures for the sterling rate were £0.67 in mid-2007 and £0.79 at the time of writing.

While the outlook is for a slower pace of growth in 2008 and 2009 relative to 2007, recent comments from the European Central Bank (ECB) point to a likely rise in official interest rates in July. Inflation remains a

<sup>1</sup> This section is based on OECD's *Economic Outlook* from June 2008.

concern, in particular the potential pass-through from rising commodity prices into wages. Headline inflation reached 3.7 per cent in May and is now expected by the OECD to average 3.4 per cent in 2008. This is well above the ECB's target of "close to but not above 2 per cent" and so the reasoning behind the possible interest rate increase is clear. However, very recently the OECD argued that the current stance of monetary policy in the euro area was correct, partly because "the effective tightening in monetary conditions" was helping to dampen underlying inflationary pressures. This is evident in the latest Euro Area Bank Lending Survey which reported that significant tightening in credit standards is taking place. The OECD expects inflation to moderate in 2009 to 2.4 per cent. This expectation is based in turn on an anticipated levelling off in commodity prices and on an easing of domestic inflationary pressures as the economy slows.

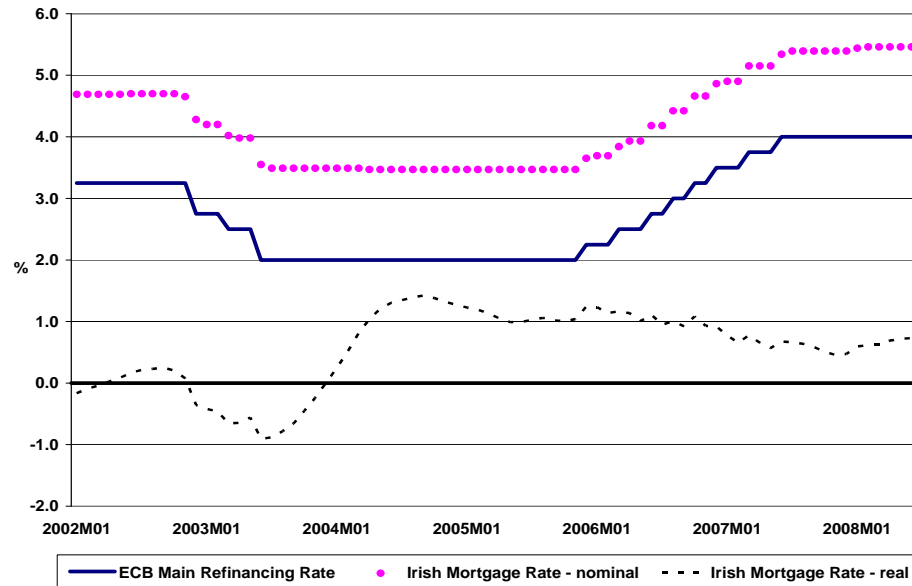
Turning to specific countries within the Euro Area, Germany appears to have been relatively immune from the global financial crisis so far, with output growing strongly in the first quarter of 2008. Among the reasons put forward to explain this are the strong financial positions of many of Germany's non-financial companies and hence their lower exposure to tightening credit conditions. Also, Germany is not experiencing a fall in house prices because house prices did not rise in recent years at rates comparable to those, for example, of the US. Nevertheless, the OECD does expect that Germany will slow somewhat during 2008 in response to a softening in growth globally, with growth for the year forecast to be 1.9 per cent, down from 2.6 per cent in 2007. For 2009, growth is forecast to be 1.1 per cent. While employment growth is expected to moderate in 2008 and 2009, the rate of unemployment is expected to remain constant in these years at 7.4 per cent.

France is expected to follow a similar pattern of growth to that of Germany, namely, a weakening during the course of 2008 followed by a recovery in 2009, although with the annual growth rate being lower in 2009. For 2008, the OECD is forecasting real GDP growth of 1.8 per cent; for 2009, their forecast is for growth of 1.5 per cent. Both of these growth rates represent a slowdown relative to 2007 when growth was 2.1 per cent. The OECD specifies three factors behind the slowdown, all of which apply to other countries – (a) the credit crunch and its likely impact on investment; (b) the appreciation of the euro and its likely impact on exports and (c) inflation and its impact on real wages. The rate of unemployment is expected to fall between 2007 and 2008, from 7.9 per cent to 7.5 per cent. The slower pace of growth in 2009 is expected to result in a minor increase in 2009, up to 7.6 per cent.

For Italy, growth in 2008 is expected to be low, at just 0.5 per cent. Unlike Germany and France, the slowdown began in 2007 and so pre-dates the difficulties caused by the global financial crisis. GDP was essentially stagnant in the third quarter of 2007 and then fell in the fourth quarter, so Italy entered 2008 without the sort of momentum that was being enjoyed in Germany and France. While Italy's slowdown may have begun before the credit crisis, any potential rebound will now be delayed as a result of the

crisis. However, the OECD does expect growth to pick up in Italy in 2009, with real GDP growth of 0.9 per cent forecast. Even with this pick-up in growth in 2009, the rate of unemployment is expected to continue to grow. A rate of 6.5 per cent is forecast for 2009, up from 6.2 per cent in 2008 and from 6.1 per cent in 2007.

**Figure 1: Interest Rates\***



\* Mortgage rate used is the Irish Representative Building Societies Mortgage Rate.  
*Source:* CSO.

## United Kingdom

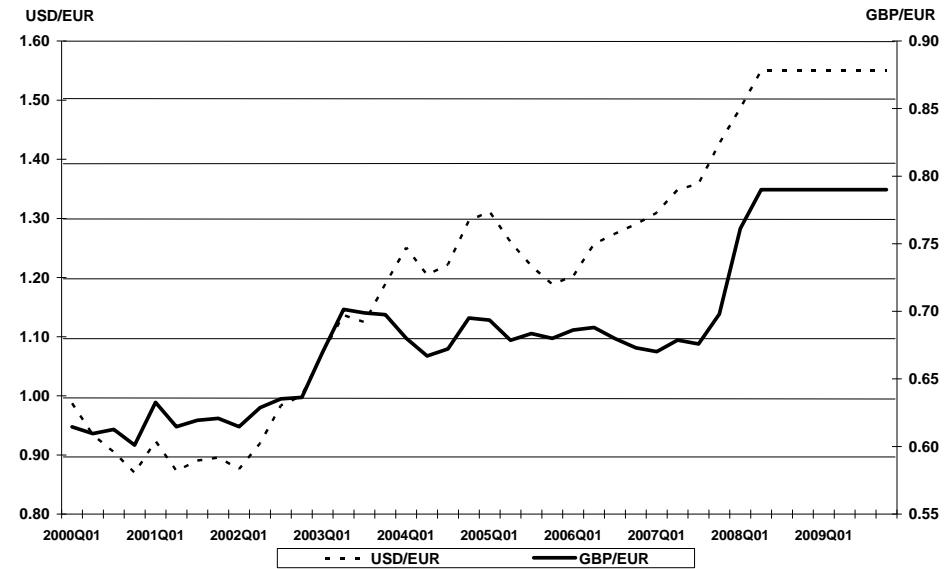
Both 2006 and 2007 were strong years for the UK economy, with growth of 2.9 per cent and 3 per cent respectively. Elements of this strong performance have persisted into the early months of 2008 – for example, employment growth remained strong and the rate of unemployment fell to 5.2 per cent. However, the OECD now expects activity to weaken in the remainder of 2008 and is forecasting growth of 1.8 per cent for the year. For 2009, the OECD expects growth of 1.4 per cent.

The causes of the forecast slowdown include the credit crisis and reductions in house prices. Both of these (related) factors are expected to contribute to an easing in consumption, with growth of just 0.6 per cent forecast for 2009. Both will also have a negative impact on residential investment – such investment is expected to contract by 4 per cent in 2008 and by 0.2 per cent in 2009. Non-residential investment is also expected to be depressed as a result of the credit crisis, although increased uncertainty and weaker domestic demand is also expected to play a dampening role.

Like many Euro Area countries, the rate of unemployment is expected to drift upwards between 2008 and 2009, rising from 5.4 per cent in 2007 to 5.5 per cent in 2008 and to 5.8 per cent in 2009. Similarly, the rate of inflation is expected to moderate between 2008 and 2009. For 2008, the OECD is forecasting a HICP rate of inflation of 3 per cent for the UK, falling to 2.5 per cent in 2009.

As with the ECB, the Bank of England is currently making interest rate decisions in the context of the conflicting trends of softening economic activity and increasing inflation. In December, January and April the Bank cut rates by 25 basis points. Since then, rates have been left unchanged suggesting, for now at least, that concerns about inflation, relative to growth, have increased.

**Figure 2: Exchange Rates**



Source: Central Bank and Financial Services Authority of Ireland (historic) and OECD (forecast).

## United States

The slowdown in the US economy continues to be a cause for concern, with no signs yet of a turning point having been reached. Instead, a number of factors continue to dampen activity, thereby giving rise to a view that the recovery will not begin until 2009. The financial crisis is believed to be reinforcing the decline in house prices. The fall in house prices, combined with falling equity prices, is depressing household wealth. As household wealth is an important determinant of consumption in the US, this decrease (the first since 2002) will have a negative impact on this hugely important component of US demand.

Consumption growth is also likely to be negatively affected by developments in the labour market and in commodity markets. Private sector employment has fallen for five consecutive months and not just in construction. Manufacturing and certain service activities have also posted declines. This weakening in the labour market would tend to result in lower nominal wage gains. When higher inflation is factored in, partly as a result of higher food and energy prices, real wage gains will be moderate.

**Table 1: Short-term International Outlook**

Country	GDP Output Growth			Consumer Price Inflation*			Average Earnings Growth			Unemployment Rate			Current Account Balance		
	2007	2008	2009	2007	2008	2009	2007	2008	2009	%			% of GDP		
										2007	2008	2009	2007	2008	2009
UK	3.0	1.8	1.4	2.3	3.0	2.5	4.3	4.7	3.5	5.4	5.5	5.8	-4.2	-3.3	-3.1
Germany	2.6	1.9	1.1	2.3	2.9	2.1	2.7	3.5	3.0	8.3	7.4	7.4	7.7	7.9	7.7
France	2.1	1.8	1.5	1.6	3.5	2.4	4.3	3.6	3.7	7.9	7.5	7.6	-1.2	-1.8	-1.6
Italy	1.4	0.5	0.9	2.0	3.6	2.1	6.4	5.0	3.2	6.1	6.2	6.5	-2.6	-2.4	-2.6
Euro Area	2.6	1.7	1.4	2.1	3.4	2.4				7.4	7.2	7.4	0.2	0.1	0.0
USA	2.2	1.2	1.1	2.8	3.9	2.2	4.5	3.5	3.0	4.6	5.4	6.1	-5.3	-5.0	-4.4
Japan	2.1	1.7	1.5	-0.5	0.3	0.3	0.3	1.5	1.3	3.9	3.8	3.8	4.8	4.4	4.4
China	11.9	10.0	9.5	5.0	6.4	5.6							10.8	10.0	9.5
OECD	2.7	1.8	1.7	2.2	3.0	2.1				5.6	5.7	6.0	-1.4	-1.3	-1.1
Ireland	5.3	-0.4	2.0	2.8	3.5	2.7	5.5	4.0	3.5	4.5	6.0	7.1	-5.1	-4.7	-4.4

Source: OECD *Economic Outlook* No. 83, June 2008.

\* HICP for Euro Area countries and the UK, CPI otherwise.

There are a number of positive features for the US that should help to offset some of the negatives just discussed. The depreciation of the dollar is helping to lift US exports and to dampen imports. Monetary policy, in terms of both interest rate cuts and the Federal Reserve's efforts to provide liquidity to financial markets, have been applied aggressively. A fiscal stimulus has also been provided, with rebates of \$115 billion dollars sent to households and \$50 billion offered to businesses in the form of depreciation allowances.

The OECD expects that the US will grow by 1.2 per cent in 2008, well down from the 2.2 per cent growth rate of 2007. For 2009, growth of 1.1 per cent is forecast. Although the annual growth figure is lower in 2009 relative to 2008, the within-year profile underlying these forecasts includes a pick-up in activity during 2009. On inflation, the OECD expect the consumer price index to fall from 3.9 per cent in 2008 to 2.2 per cent in 2009, partly in response to easing commodity prices and partly in response to the output gap that will result from two years of below trend growth. The unemployment rate is expected to average 5.4 per cent in 2008 and to rise to 6.1 per cent in 2009.

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## Asia

Japan continues to enjoy its longest expansion since the war. Exports have played a large role in this expansion and this continued in the first quarter of 2008, with double-digit growth being recorded. For 2008, real GDP is expected to grow by 1.7 per cent, down from the 2007 figure of 2.1 per cent. Exports are expected to grow by 10.3 per cent and, as a result, will play a large part again in the overall growth performance. One reason for the continued growth in Japanese exports, even in the context of a slowdown in the US, is the decline in the US share of Japanese exports. In 2000, this share was 30 per cent but by 2007, the share had fallen to 20 per cent. For 2009, the forecast is for GDP growth of 1.5 per cent. It should be noted that Japan has been largely unaffected by the global credit crisis, at least in terms of interest rate spreads which have remained steady.

In China, growth is expected to moderate in 2008 and 2009, relative to 2007. However, growth is still expected to be high, at 10 per cent in 2008 and 9.5 per cent in 2009. Inflation has become a more prominent feature of the Chinese economy in recent times. Consumer price inflation peaked at 8.7 per cent in February of this year, a significant rise from the annual average of just 1.6 per cent in 2006. While food price inflation is contributing to this trend, non-agricultural prices are also rising. This implies a loss in competitiveness for Chinese exports and hence a rebalancing in growth away from external sources and towards domestic sources in the coming years.

The general outlook for Ireland's main trading partners, according to the OECD, is for a slowing in economic activity through the course of 2008 followed by a recovery during the course of 2009. This means that growth in external demand will be weaker than had been the case in 2006 and in 2007. The OECD expects global inflation to moderate in 2009 relative to 2008 and this should be reflected in Ireland. With the signs pointing to an increase in ECB interest rates, we have built our forecasts on the assumption of an increase of 25 basis points in July and stability in rates thereafter for the duration of the forecast period. We should stress that this is an assumption as opposed to a forecast. This likely rise in ECB interest rates also points to a greater likelihood of the euro maintaining its gains of recent times relative to the dollar and sterling. For this reason, we assume that exchange rates will remain at their current levels.



# THE DOMESTIC ECONOMY

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## General

The most recent *Quarterly National Accounts (QNA)* from the Central Statistics Office (CSO), which provide a first estimate of the national accounts for 2007, suggest that despite strong growth on an annual basis in 2007, there was a marked slowdown in growth throughout the year and that output in the final quarter of 2007 was below the level of output produced in the first quarter. This slowdown was driven by a contraction in the level of investment throughout the year as residential investment fell by almost 9 per cent in volume terms. Offsetting this drag on growth was a stronger than expected growth in exports, in particular services exports, so that the external sector is estimated to have made its largest contribution to growth since 2002.

Since the beginning of this year almost all the latest economic indicators – exchequer returns, consumption indicators, Live Register, etc. – point to a sharp slowdown in the pace of economic activity. Furthermore, the consequences of the very sharp slowdown in the housing sector, which began in 2007, is likely to impact strongly on overall investment activity in 2008. The international credit crisis, which began in 2007, is now expected to lead to a deeper international slowdown in growth than was anticipated by international commentators at the time of the Spring *QEC*. Taken together, all of these developments imply a further downward revision in our output and employment forecasts for 2008, with a forecast contraction in GNP of 0.4 per cent and a rise in unemployment of 36,000, equivalent to an annual average unemployment rate of 6.0 per cent. For 2009 we expect the economy to grow modestly by 1.9 per cent, far below its medium-term growth potential as estimated in the *Medium-Term Review*<sup>2</sup> (MTR) 2008, and insufficient to prevent unemployment rising further to 7.1 per cent of the labour force.

The exception to the stream of negative indicators at present is the performance of exports. The latest data from the *QNA* suggest very strong growth in exports, especially services exports, throughout 2007. Unfortunately, as yet there are no data available on the performance of volume export growth in 2008. However, given the slowdown in world growth and the persistent strength of the euro, we expect volume export

<sup>2</sup> Fitz Gerald, J. *et al.*, 2008. *Medium-Term Review 2008-2013*, Dublin: The Economic and Social Research Institute.

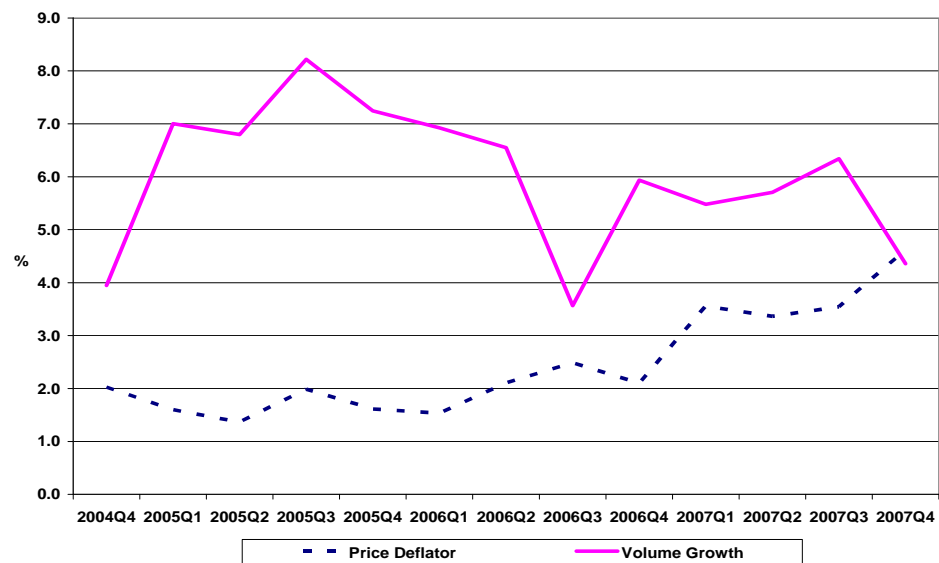
growth to slow from its very high rate of 8.2 per cent in 2007 to 4.8 per cent in 2008 and 4.4 per cent in 2009.

These forecasts imply that the Irish economy is currently in recession and that growth will remain very sluggish for the forecast horizon. Allied to this is a rapid worsening of the public finances with the General Government Balance (GGB) breaching the Stability and Growth Pact 3 per cent guideline in 2009 and the debt to GDP ratio rising rapidly from 25 per cent in 2006 to 34.5 per cent in 2009.

## Consumption

The latest *QNA* results show that private consumption expenditure grew by 5.4 per cent in volume terms in 2007. Growth in the final quarter is estimated at 4.4 per cent year-on-year, well below the average for the year. Since the beginning of 2008 all indicators of consumption – retail sales, car sales, consumer confidence, credit growth, trips abroad - have pointed to a sharp slowdown. The volume of retail sales has fallen in each month since January 2008; the most recent data for April 2008 show the volume of retail sales fell by 3.2 per cent compared with April 2007 (-2.9 per cent excluding the motor trade). In terms of car sales, the sale of new vehicles fell by 10 per cent in the first four months of 2008 compared to the first four months of 2007. The latest IIB/ESRI *Consumer Sentiment Index* (CSI) continues the downward trend of recent months. The index is now at its lowest level since the series began in 1996. Growth in trips abroad remained strong at 12.6 per cent in 2007, although moderating towards the end of the year. There is also evidence of credit tightening by the banks which may impact on consumption; annual growth in private sector credit fell to 18 per cent in April, the lowest growth rate since late 2004. In the first four months of 2008 total private sector credit increased by €9.5 billion compared to €14 billion in the first four months of 2007.

**Figure 3: Volume Consumption and Deflator: Year-on-Year Growth**



Source: *Quarterly National Accounts*, CSO.

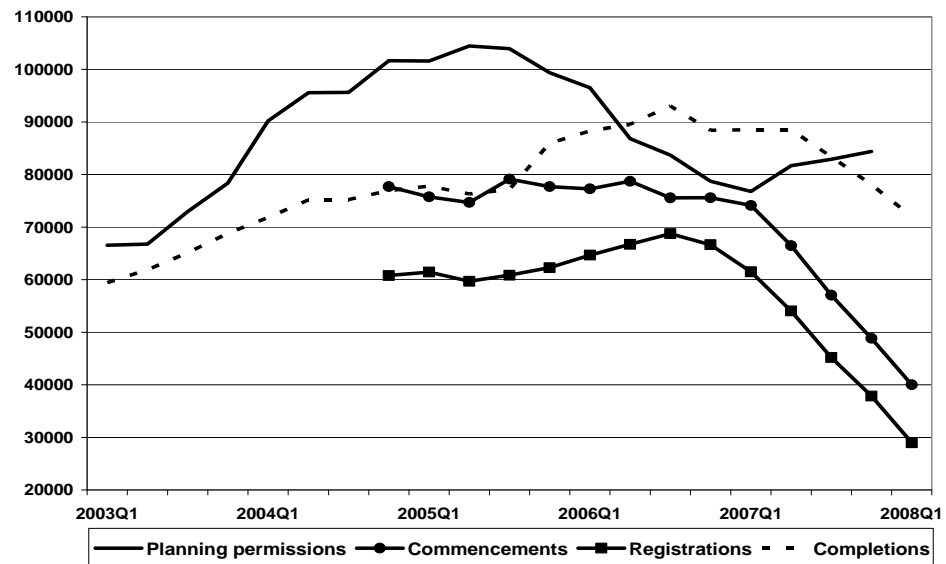
The *QNA* estimate consumption growth of 9.4 per cent in value terms in 2007, which implies a strong increase in underlying inflation. The implied growth in the private consumption deflator in 2007 is 3.8 per cent, with the quarterly data suggesting a strong surge in the rate of inflation throughout 2007. In the final quarter of 2007 the year-on-year growth in the deflator was estimated at 4.6 per cent compared to 2.1 per cent in 2006 Q4 (see Figure 3).

In 2008 we estimate that volume consumption will grow by just 1 per cent. Allowing for carryover<sup>3</sup> this forecast implies at least one quarter of falling volume consumption. We expect growth in the private consumption deflator of 3.2 per cent. This forecast slowdown in consumption growth is very dramatic both in relation to growth in recent years and historically. It is predicated on the assumption, discussed later in the *Employment* section, that employment levels and hence wage income will fall throughout 2008 and into the first part of 2009. On that basis we expect only a very moderate volume growth in 2009 of 2 per cent.

## Investment

Investment growth in the Irish economy stalled in 2007 with the latest *QNA* data showing volume growth estimated at just 0.2 per cent. This dramatic slowdown was directly related to a fall of 8.8 per cent in investment in housing, with other building and construction growing by 6.4 per cent and machinery and equipment by 12.6 per cent. The decline in housing investment built up momentum during the year, as revealed in the quarterly data; in the final quarter of 2007, in nominal terms, expenditure on new dwellings was lower than in the final quarter of 2004.

**Figure 4: Housing Statistics**



Source: Department of the Environment, Heritage and Local Government (DoEHLG).

<sup>3</sup> Carryover based on 2007 data would imply a growth rate of 1.4 per cent.

All of the indicators of investment activity suggest there will be a very sharp fall in housing investment in 2008. The most recent data on commencements suggest an annual total of just under 40,000 houses for the year ended March 2008, while data on house registrations for the year ended April 2008 show an annual total of just under 28,000. Planning permissions applications data present a slightly different picture, while they have also been falling since the end of 2005 there has been some increase since the last quarter of 2007. As can be seen in Figure 4, these declines are mirrored in the completions data which have been falling steadily since the beginning of 2007. Furthermore, indicators from the mortgage market suggest that there has been a steep decline in the number of transactions over the past twelve months. The number of residential mortgage loans fell 25 per cent year-on-year between 2007 Q1 and 2008 Q1. Based on these latest indicators we now expect total housing investment in 2008 to contract sharply, falling by 40 per cent in volume terms, and a further 16 per cent in 2009. These figures, excluding improvements, are compatible with a rate of house completions of 40,000 in 2008 and just 30,000 in 2009.

Turning to house prices, the latest *QNA* data suggest an annual growth in the dwellings investment deflator of 5 per cent in 2007. However, this annual average figure masks a steady decline in the pace of dwellings inflation through the year. Within the first quarter of 2007 the year-on-year growth rate was 9 per cent, this had fallen to just 1 per cent by 2007 Q4. Other indicators of house prices all point to a strong downward trend. Quarterly data from the DoEHLG suggest that new house prices peaked in the second quarter of 2007, falling over 5 per cent from that peak by 2007 Q4. Monthly data from the permanent tsb/ESRI House Price Index suggest new house prices peaked in February 2007 and have been falling steadily since then. There has been an acceleration in the pace of decline in recent months with a 2 per cent decline recorded between March and April 2008, the largest single monthly fall since the index began in 1996. Furthermore, data in the first four months of 2008 point to a gradual decline in rents together with a large increase in the stock of available properties.

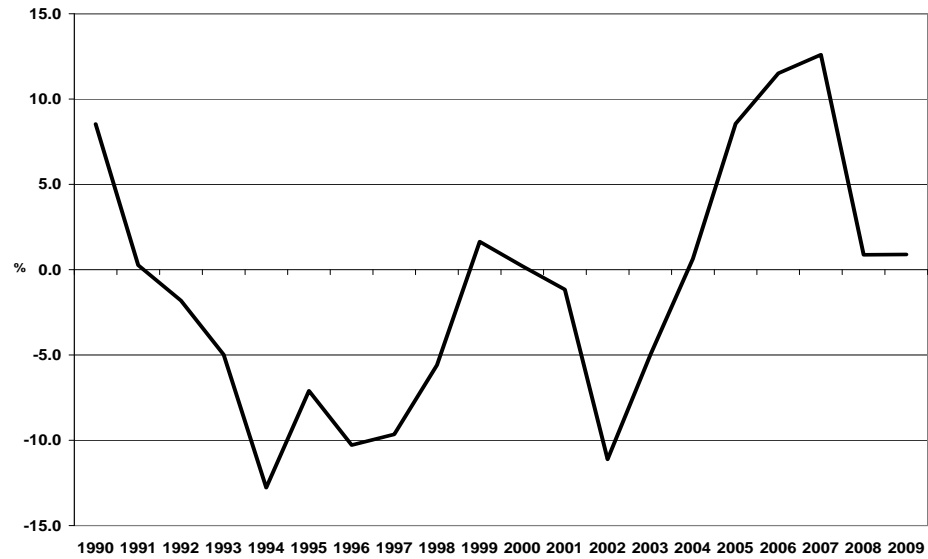
While it is clear that house prices began to fall in 2007, the annual average change was still positive at 5 per cent, much higher than the Spring *QEC* estimate of -2.7 per cent. We have therefore revised our forecast for house price changes in 2008 and 2009 downwards to -6.3 per cent and -1.5 per cent respectively. These forecasts are based on long-run estimates from our equation for housing demand.<sup>4</sup> This equation uses our forecast numbers for income, house building, population and real interest rates to forecast the implied equilibrium house price level. The most recent estimation results, shown in Figure 5, suggest that, relative to economic fundamentals, house prices were overvalued by over 12.5 per cent in 2007. Based on our forecast house price numbers this gap closes to 0.9 per cent in 2008 and 2009. These forecasts assume an orderly correction in the

<sup>4</sup> The equation is described in Duffy, Fitz Gerald and Kearney (2005), the most recent estimation uses data out to 2007.

**Table 2: Gross Fixed Capital Formation**

	2006	% Change in 2007		2007	% Change in 2008		2008	% Change in 2009		2009
	€m	Volume	Value	€m	Volume	Value	€m	Volume	Value	€m
Housing	23,221	-8.8	-4.4	22,202	-39.9	-41.4	13,004	-16.3	-14.4	11,129
Other Building	13,216	6.4	8.0	14,278	6.0	9.2	15,589	-2.0	0.9	15,735
Building and Construction	36,438	-3.3	0.1	36,480	-21.6	-21.6	28,593	-8.6	-6.0	26,865
Machinery and Equipment	9,589	12.6	9.9	10,542	6.0	7.6	11,342	5.0	6.6	12,088
<b>Total</b>	<b>46,027</b>	<b>0.2</b>	<b>2.2</b>	<b>47,022</b>	<b>-14.9</b>	<b>-15.1</b>	<b>39,935</b>	<b>-4.5</b>	<b>-2.5</b>	<b>38,953</b>

**Figure 5: Estimated Over-valuation of New House Prices**

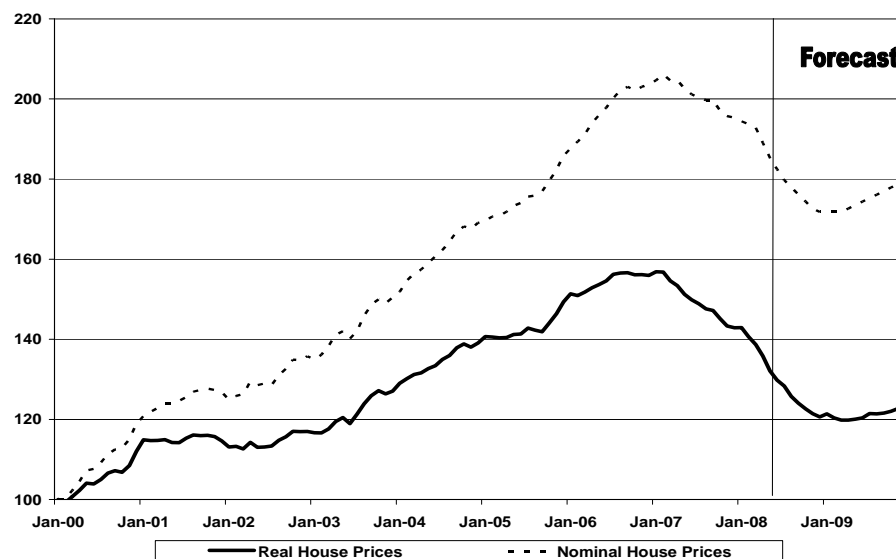


market, however, prices may well overshoot on their return to equilibrium, in which case house prices could well fall further over the short term.

A separate issue arises in translating these figures into peak-to-trough headline numbers. The *QEC* figures represent annual average changes and we do not explicitly model monthly prices. Nevertheless annual figures can be used to generate an indicative pattern of monthly changes. Figure 6 charts the implied monthly profile of new house prices both in nominal and real terms (using the permanent tsb/ESRI house price index). This graph shows that the *QEC* annual average growth rates of -6.3 per cent in 2008 and -1.5 per cent in 2009 are broadly consistent with monthly prices bottoming out at 17 per cent below the February 2007 peak in nominal terms and 24 per cent in real terms in early 2009, and with the price of new houses in December 2009 being 13 per cent below the level in February 2007 (22 per cent in real terms).

In relation to other building and construction we have reduced our forecast growth rate from the Spring *QEC*, mainly due to concerns for the commercial and retail sector. While the current National Development Plan (NDP) will ensure strong growth in public investment in building and construction, the latest forward indicators suggest that there may well be a decline in completions in the retail and commercial sector in 2009. Non-residential planning permissions data have been falling in recent months. The *QNA* estimates suggest there was volume growth of 6.4 per cent in non-residential building and construction in 2007. We expect growth of 6 per cent in 2008, supported by public investment under the NDP. For 2009 we have revised downwards our figures to a 2 per cent decline in volume. This is based on the assumption that the current slowdown in residential completions will feed into a more general decline in the retail and commercial sector in 2009.

**Figure 6: Nominal and Real House Prices,<sup>5</sup> Jan 2000=100**



There was very strong growth of 12.6 per cent in machinery and equipment investment in 2007, in large part driven by purchases of aeroplanes; excluding investment in transport equipment, the growth rate was 4.1 per cent. For 2008 and 2009 we expect relatively strong growth of 6 per cent and 5 per cent respectively. However, these forecasts are tentative in nature especially given the large discretionary impact that individual purchases can have on the overall headline growth figure. Nevertheless, the strong negative impact of the contraction in the building sector means that investment is expected to contract by 14.9 per cent in volume terms in 2008, and by 4.5 per cent in 2009. If realised, this would mean that the share of investment in GNP would fall sharply, from 31 per cent in 2005 to just under 24 per cent in 2009.

## Government Spending and Public Finances

The May exchequer returns show that total tax revenues in the first five months of 2008 were €1.5 billion lower than in the first five months of 2007, and €1.2 billion below profile. The tax take fell across all the major tax revenue items as shown in Table 3. The largest fall of over €1 billion was in capital taxes which is directly related to the sharp decline in residential property transactions in recent months. The second largest fall of over €200 million was in VAT receipts. The sharp slowdown in residential construction is likely to be an important reason for the significant fall in VAT receipts, since VAT is payable on new houses. However, a breakdown of VAT receipts identifying property-related payments is not available so we cannot be precise on the magnitude of this effect. Aside from these property-related explanations for the very sharp decline in tax revenues, the fall of €217 million in other taxes reflects the stagnation in economic activity of recent months.

<sup>5</sup> Based on permanent tsb/ESRI House Price Index for new house prices. Deflated by CPI.

**Table 3: Change in Jan-May Tax Revenues, € Millions**

	2006	2007	2008
Capital Taxes*	€689	€347	-€1,055
VAT	€718	€691	-€209
Other taxes**	€1,019	€597	-€217
Total	€2,426	€1,635	-€1,481

\*Capital acquisitions tax, capital gains tax, stamp duties.

\*\* Includes income tax, corporation tax, customs, excise etc.

The steady decline in tax revenues in the first five months of 2008 has led us to revise downwards our tax forecast figure for 2008 as a whole. While this downward revision is driven mainly by our lower output, consumption and employment forecast numbers, we have also included a once-off adjustment to our forecast VAT figure to capture the effect of the rapid decline in new house sales. Our tax forecasts now suggest that exchequer tax revenue in 2008 will total €45.6 billion, down over €2.9 billion from our Spring forecast and over €3.3 billion below the government's budget day forecast. If realised this will imply an actual fall in nominal tax revenues in 2008. Excluding capital taxes our figures suggest that tax revenue will be broadly unchanged in 2008 relative to 2007. For 2009 our tax forecast numbers suggest a modest increase in tax revenues of 2.2 per cent. With such slow growth this means that the total exchequer tax take at the end of 2009 will be below that in 2007.

The consequences of this dramatic turnaround in revenue numbers is an explosion in our estimated deficit numbers. Using official budget day expenditure figures for 2008, our revenue forecast suggests that within two years the exchequer balance and general government balance will deteriorate by more than €10 billion with the GGB moving into a deficit equivalent to 2.8 per cent of GDP. In calculating the deficit figure for 2009 we use official budget day capital revenue and expenditure figures with capital borrowing planned at €10.2 billion. We prepare an independent estimate of current expenditure in 2009 which is fully consistent with our macroeconomic forecast. This includes indexation of transfer and welfare payments and also reflects our forecast growth in public consumption of goods and services. On the basis of these numbers we forecast growth of 6.6 per cent in current expenditure in 2009. Combined with our revenue forecasts this implies that the current account surplus is wiped out by the end of 2009 and that the General Government Balance being in deficit equivalent to 3.9 per cent of GDP breaches the Stability and Growth Pact (SGP) 3 per cent guideline.

These figures are intended to be indicative rather than prescriptive. On the face of it, a breach of the 3 per cent of GDP SGP guideline in a single year does not signal the death knell of fiscal prudence and given our very low debt levels could well be afforded. However, the rapidity of the implied turnaround is a cause for serious concern. Our assumption of 6.6 per cent growth in current expenditure represents a very low growth rate and in terms of recent fiscal history would be a significant tightening of fiscal stance. Underlying that figure is a volume growth in public consumption of



goods and services of just 2 per cent compared with 6.7 per cent in 2007. Using the budget day figure for current expenditure in 2009 would reduce the implied deficit by about €600 million but would still be in breach of the 3 per cent barrier. An alternative route to reduce the deficit is to cut the level of capital expenditure. We would argue that it is very important that the NDP continue to be accorded a high priority. However, given such a difficult budgetary situation it is imperative that individual projects are very carefully scrutinised to ensure value for money. Were the public finance position to deteriorate even further than projected here, then there would be an increased need for a sequencing of projects in terms of rates of return to ensure optimal use of public funds. Hence our analysis suggests that without significant cutbacks in current expenditure, to historically low levels, the public finances are likely to breach the SGP 3 per cent barrier in 2009.

**Table 4: Public Finances**

	2006 €m	% Change	2007	% Change	2008	% Change	2009
Current Revenue	46,145	3.8	47,887	-3.4	46,252	2.2	47,292
Current Expenditure	37,077	10.3	40,890	9.6	44,827	6.9	47,926
<i>of which: Voted</i>	32,915	12.3	36,959	9.3	40,390	6.6	43,069
<b>Current Surplus</b>	9,068	-22.8	6,997	-79.6	1,425	-144.5	-634
Capital Receipts	1,871	-24.7	1,408	3.4	1,456	4.1	1,516
Capital Expenditure	8,675	15.5	10,024	10.6	11,089	5.6	11,706
<i>of which: Voted</i>	6,476	18.1	7,650	11.9	8,562	5.5	9,032
<b>Capital Borrowing</b>	-6,804	26.6	-8,616	11.8	-9,633	5.8	-10,190
<b>Exchequer Balance</b>	2,264.3		-1,618.6		-8,208.0		10,824.4
as % of GNP	1.5		-1.0		-5.2		-6.6
<b>General Government Balance</b>	5,214.3		555.4		-5,186.8		-7,409.7
as % of GDP	3.0		0.3		-2.8		-3.9
<b>Gross Debt as % of GDP</b>	25.1		25.4		29.8		34.5
<b>Net Debt as % of GDP*</b>	12.7		12.1		13.9		16.1

\*Net of Pensions Fund and Social Insurance Fund.

## Exports

Preliminary estimates from the latest *QNA* suggest a robust export performance in 2007. In the year ending 2007 Q4, volume growth in the exports of goods and services is estimated at 8.2 per cent (Figure 7), almost double the 4.4 per cent expansion recorded in 2006. Growth in the volume of merchandise exports is estimated at 4 per cent in 2007, a significant improvement on that experienced the previous year (0.8 per cent). However, consistent with recent trends, the overall export performance was driven by strong growth in non-tourism services exports, which we estimate increased by 15.7 per cent. Again this outstrips the performance of 2006, when volume growth in non-tourism services exports was 10.7 per cent.

**Table 5: Exports of Goods and Services**

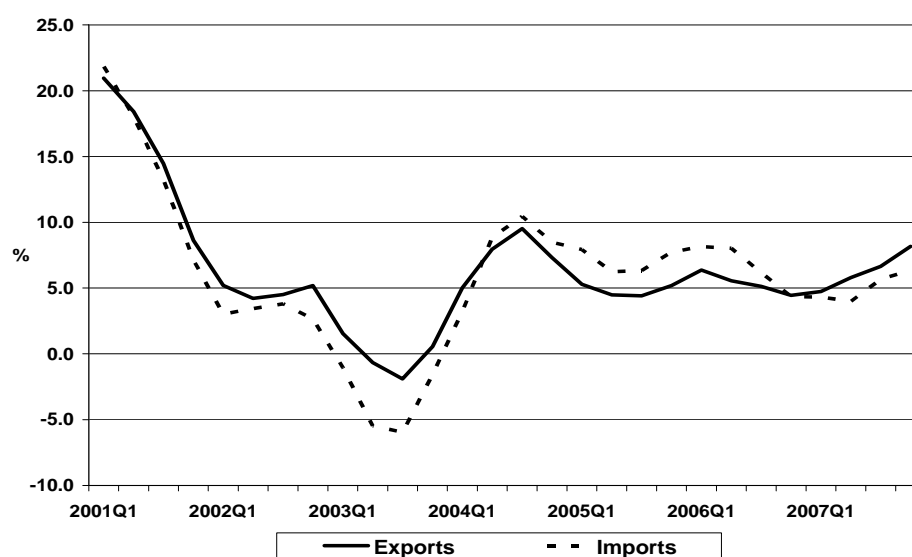
	2006		% Change in 2007		2007		% Change in 2008		2008		% Change in 2009		2009
	€m	Volume	Value	€m	Volume	Value	€m	Volume	Value	€m			
<b>Merchandise</b>	83,355	4.0	1.1	84,311	2.6	0.0	84,311	2.0	1.0	85,154			
Tourism	4,258	1.2	5.0	4,470	1.7	5.0	4,694	3.1	5.0	4,928			
Other Services	50,793	15.7	18.7	60,300	8.5	10.5	66,632	7.8	10.0	73,295			
<b>Exports of Goods and Services</b>	138,406	8.2	7.7	149,081	4.8	4.4	155,636	4.4	5.0	163,377			
FISIM Adjustment	1,360			1,465			1,615			1,771			
<b>Adjusted Exports</b>	139,766	8.2	7.7	150,546	4.8	4.5	157,251	4.4	5.0	165,148			

Merchandise export growth accelerated markedly through 2007. Export activity picked up from 2007 Q2 as inventories were depleted following a large build-up in stocks towards the end of 2006, which signalled depressed export growth in that year. At the same time the trend of falling merchandise export prices continued through 2007. According to the latest *External Trade* statistics, merchandise export prices fell by 3.1 per cent in the year ending December 2007. This means that the estimated growth in the value of merchandise exports for 2007 is well below the equivalent volume measure, 1.1 per cent compared to 4 per cent respectively. Given the continuing decline in the manufacturing *Wholesale Price Index*, which fell by 2.5 per cent in the year ending April 2008, we expect further deflationary pressures on merchandise export prices. At the time of writing, first quarter *National Accounts* data are not available to gauge precisely how merchandise export trends are developing in 2008. However, the *External Trade* statistics suggest a moderation in export activity so far this year, with the value of merchandise exports falling by 0.5 per cent in the year ending March 2007. While we expect growth in the volume of merchandise exports to be 2.6 per cent in 2008 and 2 per cent in 2009, we do not expect any growth in the value of merchandise exports this year, with just 1 per cent growth expected in 2009.

Services accounted for approximately 91 per cent of the total value growth in exports in 2007. We expect this trend to continue, with the share of services in total exports rising to 47.9 per cent in 2009, compared with 43 per cent in 2007. According to the latest *Balance of Payments* (BoP), which provides a detailed breakdown of services exports in current prices, growth in the value of non-tourism services for 2007 was 18.7 per cent. Growth was particularly strong in financial services (17.1 per cent), computer services (13.6 per cent) and business services (38.4 per cent). Meanwhile, tourism exports grew at 5 per cent over the same period. For 2007 volume growth in non-tourism services is estimated at 15.7 per cent. With the forthcoming release of the first quarter *QNA* and BoP, we expect to see a moderation in the pace of non-tourism services export growth, which we forecast to be 8.5 per cent in 2008 as a whole (10.5 per cent in value terms). Given the more pessimistic international outlook, we expect a further deceleration in non-tourism services export growth next year to 7.8 per cent (10 per cent in value terms). Growth in the value of tourism exports is expected to remain steady at 5 per cent in 2008 and 2009.

Our forecasts for overall export growth in 2008 and 2009 have been revised downwards since our previous *Commentary*. This partially reflects base effects, given the higher than expected estimates for 2007 export growth as published in the latest *QNA*. However, for the most part, our downward revision takes into account the increasingly difficult international environment, with growth in our major export destinations stagnating this year and only recovering mid-way through 2009. We now expect export volume growth of 4.8 per cent in 2008 and 4.4 per cent in 2009. The equivalent value measures are 4.5 per cent and 5 per cent, respectively.

**Figure 7: Exports and Imports Volume Growth Rates (Annual Averages)**



Source: *Quarterly National Accounts*, CSO.

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## Imports

According to the preliminary estimates from the latest *QNA*, import volume growth was 6.4 per cent in 2007 (Figure 7). Underlying this was an increase in the volume of merchandise imports of 4.7 per cent, whereas services imports grew by 7.8 per cent in volume terms. The *Balance of Payments* data suggest a strong growth in the value of tourism imports in 2007, with an estimated increase of 16 per cent. Meanwhile, the value of merchandise and non-tourism services exports rose by 6 per cent and 9.5 per cent respectively in 2007. Overall import value growth in 2007 is estimated at 8.1 per cent.

Merchandise import volume growth was estimated at 1.6 per cent in 2006 according to the Central Statistics Office. In 2007 that growth is estimated to have increased to 4.7 per cent. This increase in growth appears to be driven by the rebound in industry (excluding building and construction) through 2007. Looking across the various commodity groups, the *External Trade* statistics indicate continued strong growth in the value of food imports, at 9 per cent in the year ending February 2008, alongside growth of 14 per cent in petroleum products. Given the moderation in economic activity domestically, these trends in part reflect the rising price of these commodities on international markets in recent months. However, the total value of merchandise imports is estimated to have fallen by 0.8 per cent in the year ending March 2008. We anticipate merchandise import growth to moderate in 2008 relative to 2007, with volume growth forecast to be 3.4 per cent this year. This trend is expected to continue in 2009, with merchandise import volume growth of 3 per cent. The equivalent value forecasts in 2008 and 2009 are 5 per cent and 4.5 per cent respectively.

**Table 6: Imports of Goods and Services**

	2006		% Change in 2007		2007		% Change in 2008		2008		% Change in 2009		2009		
	€m	Volume	Value		€m	Volume	Value		€m	Volume	Value		€m	Volume	Value
<b>Merchandise</b>	57,967	4.7	6.0		61,433	3.4	5.0		64,505	3.0	4.5		67,407		
Tourism	5,446	13.7	16.0		6,318	2.4	5.0		6,634	2.4	5.0		6,966		
Other Services	57,025	7.3	9.5		62,415	2.0	4.0		64,912	3.1	5.0		68,157		
<b>Imports of Goods and Services</b>	120,438	6.4	8.1		130,166	2.7	4.5		136,050	3.0	4.8		142,530		
FISIM Adjustment	559				605				629				661		
<b>Adjusted Imports</b>	120,997	6.4	8.1		130,771	2.7	4.5		136,679	3.0	4.8		143,191		

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## Balance of Payments

According to the latest *Balance of Payments* data, growth in the value of non-tourism services imports is estimated at 9.5 per cent in 2007, while the value of tourism imports grew by 16 per cent. In volume terms services imports are estimated to have grown by 7.8 per cent by the CSO, compared to 7 per cent growth in 2006. However, this strong growth is expected to moderate significantly in 2008 and 2009. Consistent with the reduction in personal consumption growth discussed above, the value of tourism imports is expected to grow by just 5 per cent this year and next. Meanwhile non-tourism services are forecast to increase by 4 per cent and 5 per cent in 2008 and 2009 respectively in value terms.

We forecast import volume growth of 2.7 per cent in 2008, increasing slightly to 3 per cent in 2009. The slowdown in 2008 is primarily driven by the sharp fall in private consumption growth. In value terms we expect imports to increase by 4.5 per cent in 2008 and 4.8 per cent in 2009.

Our forecasts for merchandise imports and exports suggests a further narrowing of the merchandise trade balance in 2008 and 2009. We expect the merchandise trade balance to contract by 13.4 per cent this year and 10.4 per cent next year. This follows an estimated narrowing of 9.9 per cent in 2007. The deterioration in the merchandise terms of trade, which is estimated at 3.9 per cent for 2007, is also expected to continue. Our forecasts suggest merchandise export prices will continue to fall alongside rising import prices.

Services exports have been growing much faster than services imports for a number of years now, and as noted above this trend is expected to continue in 2008 and 2009. This contributes to a further narrowing in the services trade deficit in 2008 of 94.4 per cent according to our forecasts. In 2009 we expect Ireland to record a surplus in services trade, the first time it has done so since 1982.

Up until 2007 the rapid contraction in the services deficit was not sufficient to counteract the fall in the merchandise trade balance. This caused the total trade balance to decline significantly from a peak of 21.2 per cent of GNP in 2002 to an estimated 12 per cent of GNP in 2006. This trend now appears to have reversed. The strong performance of services is expected to compensate entirely for the contraction in the merchandise trade balance in 2008 and 2009, as it is estimated to have done in 2007 according to the latest *QNA*. We now expect the trade balance to rise from an estimated 12 per cent of GNP in 2007 to 12.4 per cent of GNP in 2008 and 12.8 per cent of GNP in 2009. However, small gains in the services terms of trade are still not sufficient to counteract the significant decline in Ireland's merchandise terms of trade. Hence, we expect a further deterioration in the total terms of trade over our forecast horizon.

Concerning net factor flows, the *Balance of Payments* data suggest that the net factor income deficit widened by 8.6 per cent in 2007. Credit flows increased by 26.6 per cent over the same period. These credit flows were dominated in terms of scale and in terms of growth by portfolio and other

investment income, which grew by 29.4 per cent. Meanwhile direct investment income is estimated to have grown by 10.5 per cent in 2007, well below the 29.8 per cent growth seen in 2006. Debit factor flows increased by 21.3 per cent in 2007. While the underlying flows on the debit side of the balance of payments tend to be very volatile, particularly in the portfolio and other investment categories, there appears to have been a significant increase in the level of Irish direct investment abroad in 2007, which grew by 13.2 per cent.

Our forecasts for 2008 and 2009 see the net factor income deficit widen by 0.8 per cent and 3.6 per cent respectively. There is a significant amount of uncertainty around these forecasts given the scale and volatility of the underlying flows. Together with our forecasts for the trade balance, this implies an effective current account balance equivalent to -5.8 per cent of GNP estimated for 2007, narrowing in 2008 to -5.4 per cent of GNP and in 2009 to -5.1 per cent of GNP.

**Table 7: Balance of Payments\***

	2006 €m	Change %	2007 €m	Change %	2008 €m	Change %	2009 €m
Merchandise Trade Balance	25,388	-9.9	22,878	-13.4	19,806	-10.4	17,747
Service Trade Balance	-7,420	-46.6	-3,963	-94.4	-221	-1,505.9	3,100
<b>Trade Balance in Goods and Services on BoP basis</b>	17,968	5.3	18,915	3.5	19,586	6.4	20,847
<b>% of GNP</b>	12.0		12.0		12.4		12.8
Total Debit Flows	84,651	21.3	102,695	15.0	118,079	16.2	137,234
Total Credit Flows	59,870	26.6	75,782	20.0	90,938	20.0	109,126
<b>Net Factor Flows</b>	-24,781	8.6	-26,913	0.8	-27,141	3.6	-28,107
<b>Net Current Transfers</b>	-465		-1,278		-1,278		-1,278
<b>Balance on Current Account</b>	-7,278		-9,276		-8,833		-8,539
Capital Transfers	223		39		300		300
<b>Effective Current Balance</b>	-7,055		-9,237		-8,533		-8,239
<b>% of GNP</b>	-4.7		-5.8		-5.4		-5.1

\*This table includes adjustments to *Balance of Payments* basis.

## Measures of Growth

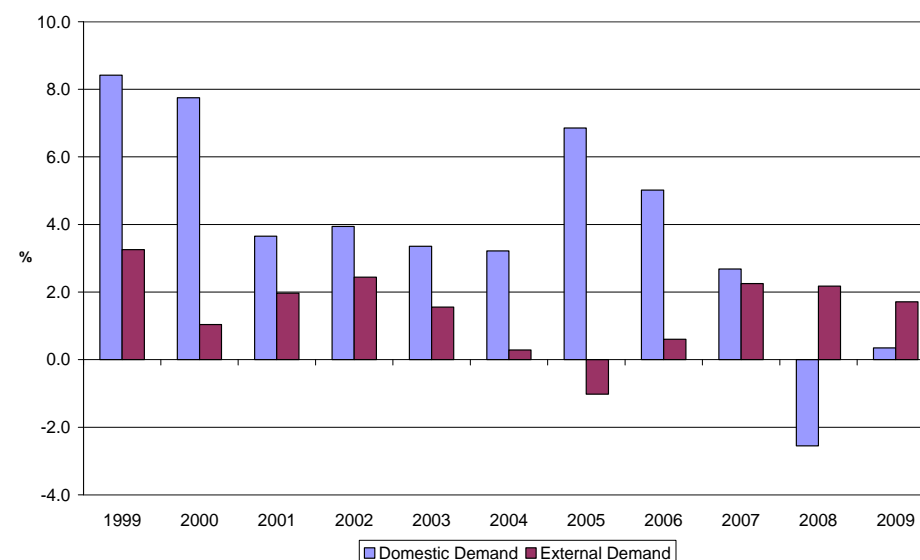
We forecast that GNP will fall by 0.4 per cent in 2008 and increase by 1.9 per cent in 2009. While GNP is generally used as the headline growth rate, there are several other measures that could well be regarded as better measures of welfare. First, GNDI (Gross National Disposable Income) is a more appropriate measure of a country's overall level of income since it also includes changes in the terms of trade and net international transfers. Given a further deterioration in the terms of trade, with import price inflation expected to continue to outpace export price inflation, our forecasts imply that GNDI will fall by 2.6 per cent in 2008 and rise by only 0.8 per cent in 2009. Second, GNP per capita, which adjusts for increases in the population size largely driven by inward migration, indicates a larger fall of 1.9 per cent in 2008 and a more modest rise of 1.5 per cent in 2009.

The most recent national accounts data suggest that in 2007 the external sector made its largest contribution to the overall growth rate since 2002. Our forecasts for 2008 and 2009 suggest that the recession will be entirely driven by domestic demand. As shown in Figure 8 the external sector is forecast to add over 2 per cent to the overall growth rate in 2008, slowing to 1.7 per cent in 2009. The shrinking of the domestic sector is confirmed in Table 8, which shows that the investment to GNP ratio plummets from 31 per cent in 2005 to just 23.9 per cent in 2009.

**Table 8: Measures of Growth**

Growth Indicators	2005	2006	2007	2008	2009
GNP	4.9	6.5	4.5	-0.4	1.9
GNP adjusted for Terms of Trade	3.8	4.5	2.5	-2.5	0.7
GNDI	3.7	4.0	2.0	-2.6	0.8
National Resources	3.6	4.0	1.9	-2.4	0.8
GNP per capita (constant prices)	2.6	3.8	2.2	-1.9	1.5
Consumption per capita (constant prices)	5.0	3.1	3.0	-0.5	1.6
Personal disposable income per capita	6.7	3.7	5.4	2.9	3.8
Investment in Housing/GNP	15.5	15.6	14.1	8.2	6.8
Investment/GNP	31.0	30.9	29.8	25.3	23.9
Domestic Demand (constant prices)	5.7	5.7	3.1	-3.0	0.4

**Figure 8: Contributions to Growth**

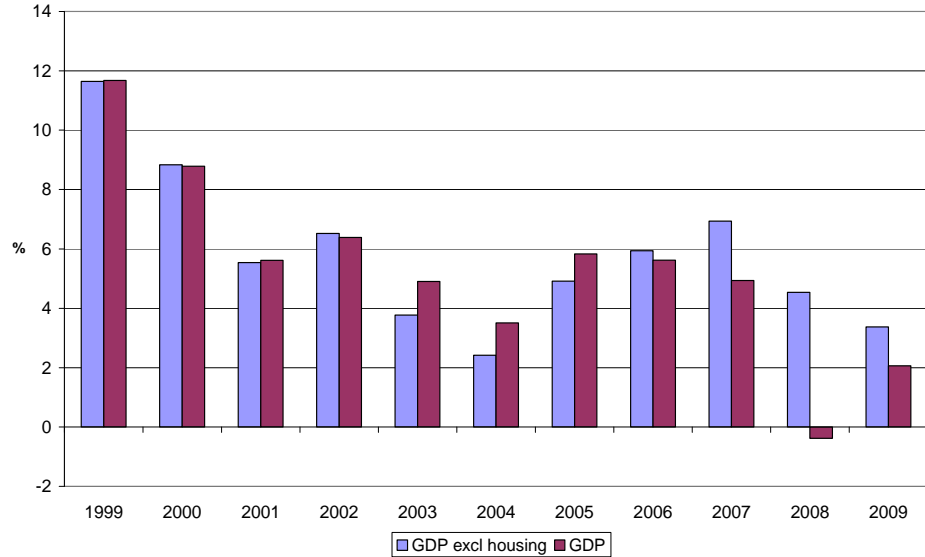


The role of the forecast decline in housing for the headline growth figure in 2008 is pivotal. Figure 9 shows the growth rate in GDP including and excluding investment in housing. In the years 2003 through to 2005 the very rapid growth in the housing sector made significant contributions to otherwise relatively sluggish overall growth rates. These were the years when the external sector performed poorly. Interestingly, the first estimates of growth in 2007 suggest a growth rate of almost 7 per cent in GDP



excluding housing, in other words the decline in housing investment in 2007 knocked 1.7 percentage points from the overall GDP growth rate. Our forecast figures for 2008, with GDP falling by 0.4 per cent, mask a strong growth in non-housing GDP of 4.5 per cent. This growth rate falls to 3.4 per cent in 2009.

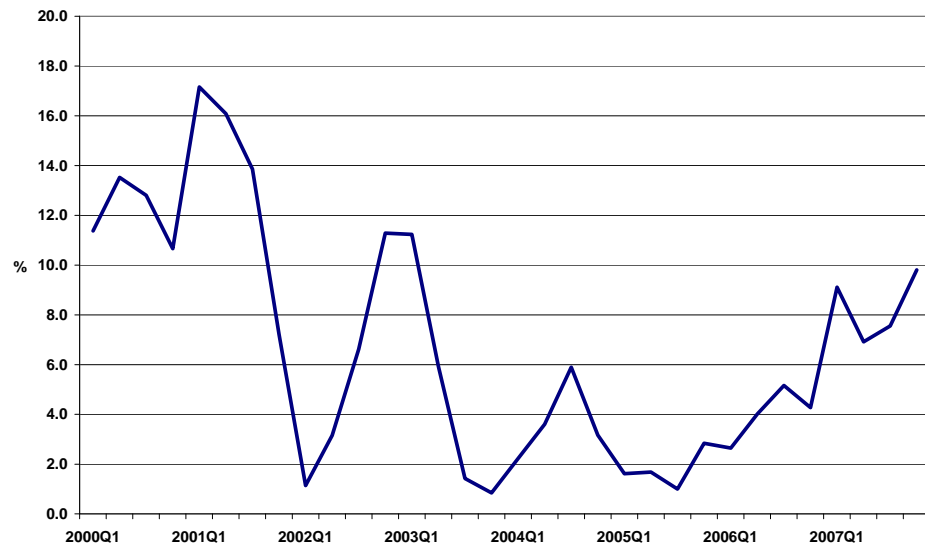
**Figure 9: Growth Rates**



**Sectoral Output**

As noted in recent *Commentaries*, industry (excluding construction) has posted a surprisingly strong performance in recent times. This can be seen in Figure 10 where the annual growth rates from the *Quarterly National Accounts* are shown, including the most recent reading for 2007 Q4. Three troughs can be seen in the figure -2002 Q2, 2003 Q4 and, most recently, 2005 Q3. Growth rebounded after each trough and the rate of growth recorded in 2007 Q4 was higher than at any time since early 2003.

**Figure 10: Annual Growth in Industrial Output (Excluding Building and Construction), 2000 Q1 to 2007 Q4**



Source: *Quarterly National Accounts*.

**Table 9: GDP by Sector**

	2006			2007			2008			2009
	€m	Volume	Value	€m	Volume	Value	€m	Volume	Value	€m
<b>Agriculture</b>	3,918	-9.2	-6.0	3,683	1.0	2.0	3,757	1.0	2.0	3,832
<b>Industry:</b>	53,043	6.9	5.8	56,099	-3.1	-5.6	52,942	-0.1	0.1	53,021
Other Industry	37,906	9.8	7.0	40,560	3.0	0.5	40,762	2.0	2.0	41,578
Building & Construction	15,137	-1.1	2.7	15,539	-21.6	-21.6	12,179	-8.6	-6.0	11,443
<b>Services:</b>	96,417	5.9	8.1	104,191	1.3	3.6	107,942	3.4	4.8	113,087
Public Administration & Defence	5,485	2.0	7.0	5,869	0.0	4.5	6,133	0.0	3.0	6,317
Distribution, Transport and Communications	23,075	6.0	8.0	24,921	0.0	3.8	25,864	2.0	3.8	26,842
Other Services (including rent)	67,857	6.2	8.2	73,440	1.9	3.5	75,945	4.2	5.2	79,928
<b>GDP at Factor Cost – Output Basis</b>	153,378	5.9	6.9	163,973	-0.3	0.4	164,641	2.2	3.2	169,940

This strong performance is also seen in the figures from the *Industrial Production and Turnover* release. Figures for March 2008 show output growing by 4.5 per cent on an annual basis, with the growth concentrated in the modern sector. While annual growth in the modern sector was running at 5.6 per cent in March 2008, the corresponding figure for the traditional sector was just 1.5 per cent.

In spite of this strong performance in recent times, we expect industry to record a slower pace of growth in 2008 and 2009 as a result of slower growth in Ireland's export markets and the unfavourable movements in exchange rates in recent months. We expect the volume of output in industry to grow by 3 per cent in 2008 and by 2 per cent 2009. We anticipate that building activity will contract severely in 2008 and at a more modest pace in 2009. Our reasoning is discussed in the section on *Investment* above.

The *Quarterly National Accounts* for 2007 Q4 showed that output from *services* grew by 5.9 per cent in that year. The growth rates for the different components of this sector were as follows – 2 per cent for public administration and defence; 6 per cent for distribution, transport and communications; 6.2 per cent for other services (including rent). As discussed in the previous *Commentary* and in the recently published *Medium-Term Review*, an increasingly notable feature of services output is the extent to which it is exported. While we expect services, and services exports in particular, to be the primary source of economic growth in the medium term, we expect 2008 to be a year of very slow growth in this sector. Our forecast is for growth of 1.3 per cent in volume terms for 2008, although with value growth exceeding this at 3.6 per cent. This low growth rate reflects both our expectation of very slow growth in the domestic retail market and in tourism exports, together with the likely dampening effects of the current credit crisis on the financial services sector. For 2009, more robust growth in services output is anticipated. Our forecast for volume growth is 4.8 per cent; the corresponding figure for value growth is 4.8 per cent.

For *agriculture*, we are forecasting volume growth of 1 per cent in each of 2008 and 2009, with value growth of 2 per cent forecast for each year also.

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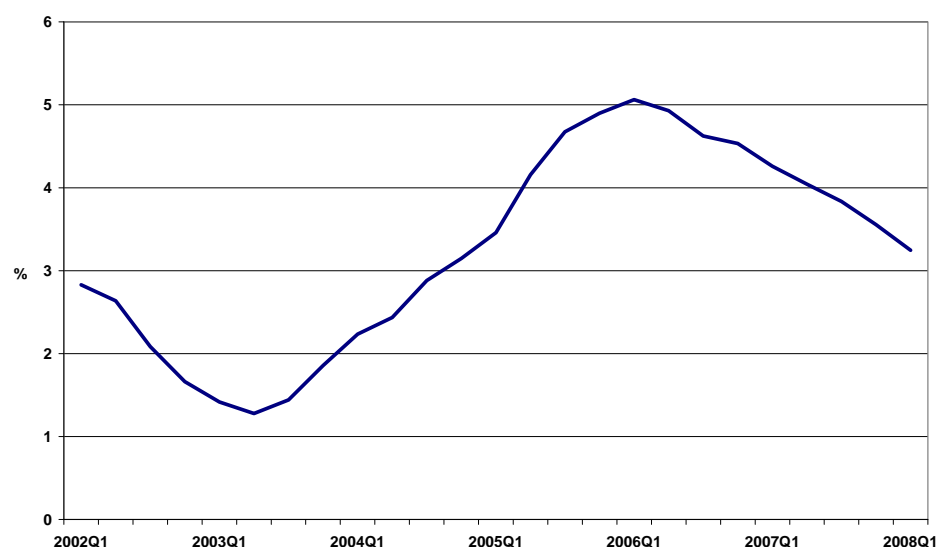
## Employment

The figures from the latest *Quarterly National Household Survey (QNHS, 2008 Q1)* point to a continuing decline in the rate of job growth. As shown in Figure 11, employment growth peaked in the first quarter of 2006, at an annual rate of 5.1 per cent. The annual rate of growth has declined steadily since then and reached 3.3 per cent in the first quarter of 2008.

While the rate of job growth may have been declining, these figures from the *QNHS* do not appear to suggest an overly dramatic decline in employment growth in the latter part of 2007 and early 2008. As such, the figures have begun to diverge from other indicators of employment. For example, the CSO's *Index of Construction Employment* fell by 10.8 per cent in the year ending February 2008, the same period covered by the *QNHS*. By

contrast, the *QNHS* only shows a decline of 10,000 jobs in construction in the year ending February 2008, a fall of just 3.5 per cent.

**Figure 11: Annual Rate of Employment Growth by Quarter, 2002 Q1 to 2008 Q1**



Source: *Quarterly National Household Survey*.

**Table 10: Employment and Unemployment**

	Annual Averages 000s			
	2006	2007	2008	2009
Agriculture	116.0	116.1	116.1	115.5
Industry	564.4	577.6	549.4	521.1
Services	1,363.4	1,423.4	1,450.1	1,466.1
Total at Work	2,043.7	2,117.0	2,115.6	2,102.7
Unemployed	94.8	100.5	136.0	159.5
Labour Force	2,138.5	2,217.5	2,251.6	2,262.2
Unemployment Rate %	4.4	4.5	6.0	7.1
Net Migration	71.8	67.3	31.0	-20.0
of which: Inward Migration	107.8	109.5	76.0	40.0
Change in Participation Rate*	1.0	1.2	0.3	-0.1

\* Note: Participation rate measured as share of population aged 15-64 years.

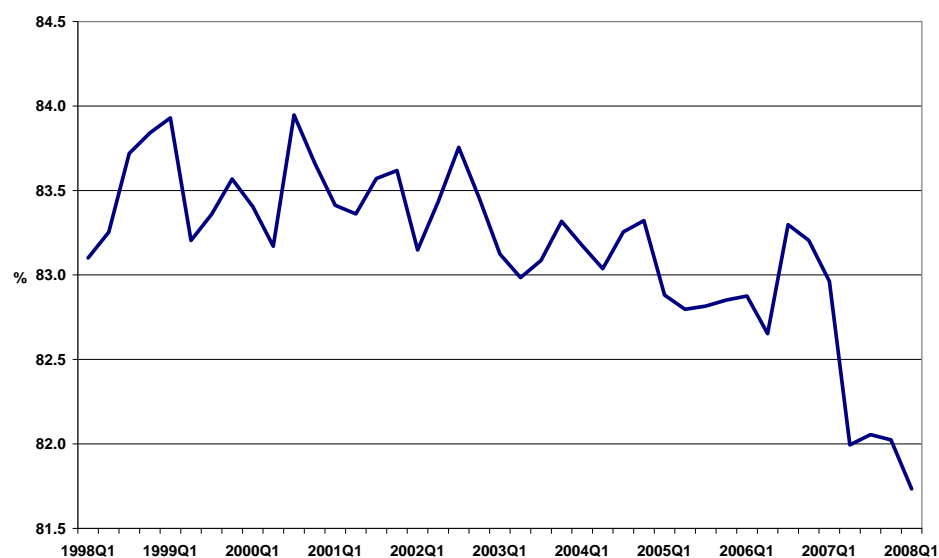
On a related point, the *QNHS* shows an increase of 8,700 in the numbers unemployed in the year ending February 2008 while the numbers on the Live Register in the same period increased by 30,000. As is well known, the measures of unemployment provided by the *QNHS* and the Live Register are not directly comparable but the difference in magnitude is large and at least suggestive of a more pronounced softening in the labour market than is indicated by the *QNHS*.

It is possible to get a better understanding of the apparent discrepancies between the *QNHS* and other indicators of employment trends by looking

more closely at some of the numbers in the *QNHS*. As noted above, the *QNHS* shows 10,000 fewer people working in construction in the year ended February 2008. However, this number is made up of a fall of almost 17,000 employees and a rise of 7,000 self-employed people in construction. This suggests that many of those who were laid-off by contractors now appear in the data as being self-employed as opposed to being unemployed.

This trend away from employee status and towards self-employment could capture a fall in the true rate of labour usage if these people are working fewer hours as self-employed. It should be recalled that in order to be classified as “employed” on an ILO basis, only one hour has to be worked in the reference week. Another potential detail within the *QNHS* which could point to an over-estimation of labour usage is the proportion of the workforce that is employed part-time. As shown in Figure 12, the proportion of the workforce that is full-time peaked at 83.3 per cent in the third quarter of 2006. Since then, it has been trending downwards and was 81.7 per cent in 2008 Q1.

**Figure 12: Full-time Employment as a Percentage of Total Employment, 1998-2008**

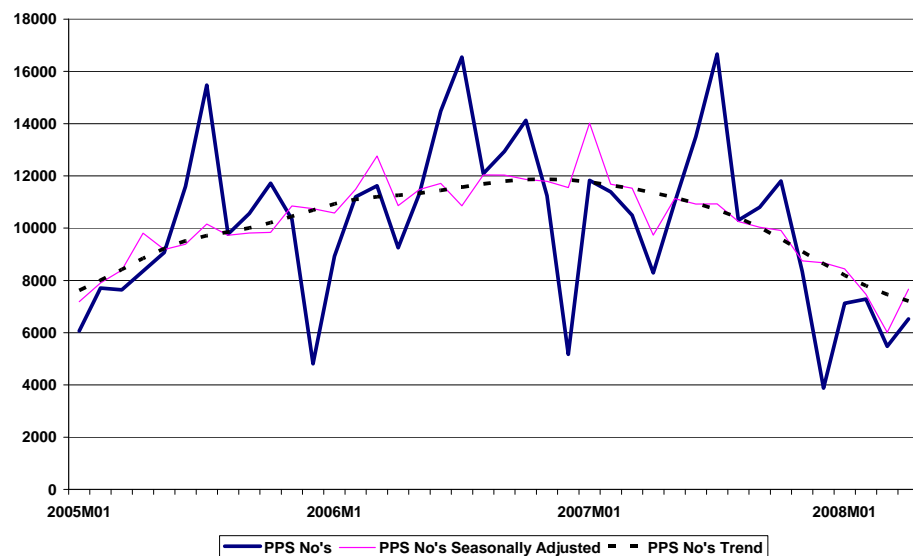


Source: *Quarterly National Household Survey*.

The move towards more self-employed and more part-time employment in the *QNHS* numbers suggest that the labour market may have been softening in the latter part of 2007 to a greater degree than suggested by the headline figure in the *QNHS*. Furthermore, early indicators for 2008 point to a further weakening. The numbers on the Live Register have increased by 21,000 since the start of the year (on a seasonally adjusted basis) and, at 201,000 in May 2008, are almost 50,000 higher year-on-year. The *Index of Construction Employment* was down 13.8 per cent in April. Finally, there is evidence to suggest that the rate of inward migration is slowing partly, we would argue, in response to a weaker labour market. As shown in Figure 13, the trend in the issuing of PPS numbers to nationals of the EU New Member States is now downwards.

Turning to our forecasts, we expect employment to average 2,116,000 in 2008, almost unchanged from 2007. However, this average annual figure hides a much more dynamic employment pattern on a quarterly basis. Quarterly *QNHS* numbers have recorded employment increases in each quarter between 2007 Q1 and 2008 Q1. This means that in order to have stability in the average number employed between 2007 and 2008 we are forecasting job losses in each of the last three quarters of 2008. Similarly, we expect the annual unemployment rate to average 6 per cent in 2008; however, this average implies an increase from 4.7 per cent in 2008 Q1 to 7.2 per cent by Q4.<sup>6</sup> We expect the rate of inward migration to slow to 76,000 in 2008, down from 109,500 in 2007.

**Figure 13: PPS Numbers Issued to Citizens of the EU Accession States**



For 2009, we expect a resumption of net employment gains in the latter part of the year as the economy picks up but the carry-over from year end job losses in 2008 implies an average employment number of 2,103,000 next year and hence a lower average than in 2008. The unemployment rate will average 7.1 per cent, with the rate reaching 7.4 per cent by the end of 2009. As a result of the overall difficulties being forecast for the economy, we expect net outward migration to re-emerge in 2009 and are forecasting a net outflow of 20,000 in that year. Without such an outflow, the rate of unemployment would likely rise above 8 per cent. It seems implausible to us that migratory flows would not react to such a situation. Our thinking on this is influenced by work published in earlier *Commentaries*<sup>7</sup> which showed how migration flows between Ireland and the UK tended to react to changes in the difference between the rates of unemployment in the two jurisdictions. The reaction was such that any widening of the gap between the rates of unemployment tended to be reduced as a result of the labour

<sup>6</sup> The June CSO *Live Register* publication estimated the *QNHS*-consistent unemployment rate in May to be 5.4 per cent.

<sup>7</sup> Honohan, Patrick, 1984. "The Evolution of Unemployment in Ireland, 1962-83", *Quarterly Economic Commentary* (May) and Honohan, Patrick, 1992. "The Link Between Irish and UK Unemployment", *Quarterly Economic Commentary* (Spring).

flows whereby a long-run stable gap was restored. We should also note that given the deterioration in labour market prospects over the forecast horizon we expect that the participation rate will stabilise at its 2007 level.

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## Incomes

The most recent data on earnings that are available from the CSO relate to the last quarter of 2007. Hence, they are somewhat dated. They show hourly earnings growing by 5.7 per cent on an annual basis in construction and weekly earnings growing by 4 per cent, 4.1 per cent and 4.4 per cent in distribution, business services and the public sector (excluding health) respectively. From these figures, we can conclude that earnings continued to grow at a healthy pace in 2007 and our belief is that economy-wide earnings will be shown to have grown by 5.5 per cent when the national accounts for the year are released.

Given the softening in the labour market that we believe to be underway in 2008, it would be expected that real wage growth would slow. With CPI inflation now expected to average 4.5 per cent in 2008, we expect nominal wages to grow by just 4 per cent, thereby implying a fall in real wages. This fall in real wages is not expected to persist in 2009, although with nominal wages growing by 3.5 per cent and CPI averaging 3.5 per cent also, we do not foresee any growth in real wages.

Our combined forecasts for nominal wage growth and employment in 2008 suggest that the non-agricultural wage bill will grow by 3.9 per cent in 2008. This would represent a remarkable slowing from the 2007 figure of 9.5 per cent. For 2009, our forecast for growth in the non-agricultural wage bill is an even lower figure of 2.9 per cent. When combined with our forecasts for other elements of nominal income growth and with our forecasts for nominal consumption growth,<sup>8</sup> these forecasts imply relative stability in the savings rate between 2007 and 2008 before drifting upwards in 2009.

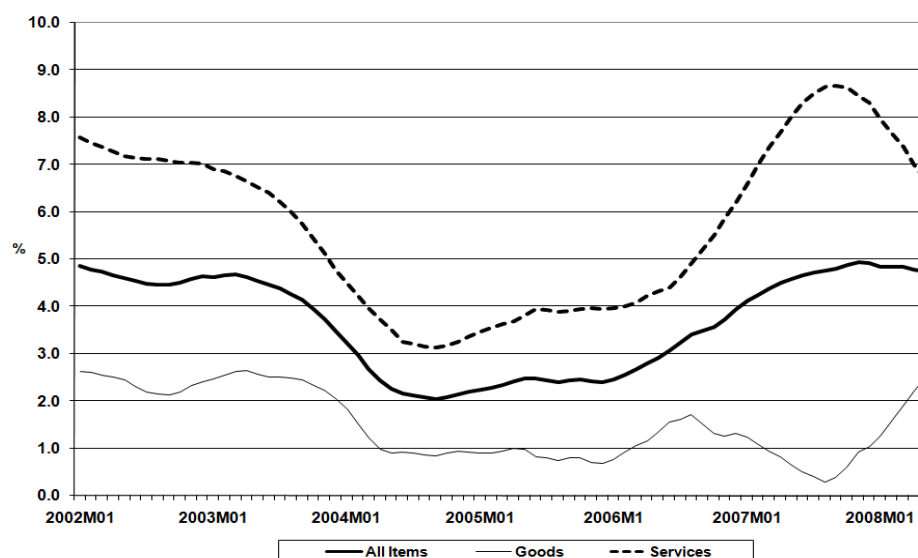
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## Consumer Prices

Inflation, as measured by the *Consumer Price Index* (CPI), was estimated to be 4.7 per cent in May 2008, which was lower than in preceding months. However, the reported year-on-year changes in the CPI have been volatile so far in 2008, in part a reflection of the volatility in international commodity markets. Looking at the 12 month moving average inflation rate (Figure 14), this volatility is smoothed somewhat, with inflation estimated at 4.7 per cent in the year ending May 2008. This is slightly below the annual rate of inflation of 4.9 per cent in 2007.

<sup>8</sup> Our forecast for nominal consumption growth is based on a volume increase of 1 per cent and a consumption deflator of 3 per cent. It should be noted that the personal consumption deflator is not identical to either the CPI or HICP measures of price change, although it is, of course, related.

**Figure 14: CPI Inflation Rate, Annual Average**



Source: Consumer Price Index, CSO.

Changes in the CPI through 2007 were dominated by the mortgage interest component of the index. For the year ending September 2007, 62.5 per cent of the total change in the CPI over that period was attributable to rising mortgage interest rates related to previous ECB decisions to increase their main refinancing rate. Given the ECB rate has not increased since June 2007, the impact of the mortgage interest component on overall CPI has diminished. For the year ending May 2008 41.3 per cent of reported CPI inflation for the period was due to mortgage interest rates (24 per cent when comparing May 2008 with May 2007). Were it not for the spreads between the ECB rate and the inter-bank lending rates facing mortgage lenders as a result of the credit crisis, we may have seen even further moderation in the increase of the mortgage interest component of the CPI in recent months<sup>9</sup>. However, it is likely that that the course of CPI inflation will be heavily influenced again in the coming months by trends in mortgage interest rates.<sup>10</sup> Our forecasts for CPI inflation assume a 25 basis points increase in the ECB main refinancing rate in July and remaining at that level for the remainder of our forecast horizon to the end of 2009. Our assumptions on ECB interest rates follow from strong signals by President Trichet amid concern over the extent to which rising food and oil prices are leading to higher inflation, and more crucially, higher inflation expectations. As can be seen in Figure 14, goods price inflation has increased significantly in recent months driven by the developments in commodity prices.

<sup>9</sup> The representative building society mortgage rate (see Figure 1) has increased in recent months despite the ECB interest rate remaining unchanged. Also the impact of mortgage rate changes on the Housing and Fuel CPI sub-index was significantly higher in May 2008 than is usually the case without an ECB rate change.

<sup>10</sup> This reflects the weighting and calculation of mortgage interest in compiling the Irish CPI. See McCarthy, C., 2007. "Owner-occupied Housing and Bias in the Irish Consumer Price Index", *ESRI Quarterly Economic Commentary*, Autumn for a detailed discussion.



**Table 11: Personal Disposable Income**

	2006		Change		2007		Change		2008		Change		2009	
	€m	%	€m	€m	%	€m	€m	%	€m	€m				
Agriculture, etc.	3,195	-6.0	-192	3,003	2.0	60	3,063	2.0	61	3,125				
Non-Agricultural Wages	72,426	9.5	6,886	79,312	3.9	3,115	82,427	2.9	2,358	84,785				
Other Non-Agricultural Income	16,383	2.8	455	16,838	3.1	520	17,358	4.3	745	18,103				
<b>Total Income Received</b>	92,004	7.8	7,149	99,153	3.7	3,695	102,848	3.1	3,164	106,013				
Current Transfers	18,031	11.6	2,097	20,129	7.1	1,432	21,561	7.7	1,668	23,228				
<b>Gross Personal Income</b>	110,035	8.4	9,247	119,282	4.3	5,127	124,409	3.9	4,832	129,241				
Direct Personal Taxes	21,373	10.7	2,294	23,667	3.5	821	24,488	2.6	643	25,131				
<b>Personal Disposable Income</b>	88,662	7.8	6,952	95,614	4.5	4,306	99,921	4.2	4,190	104,110				
Consumption	82,483	9.4	7,787	90,270	4.2	3,820	94,090	3.8	3,609	97,700				
<b>Personal Savings</b>	6,179			5,344			5,830			6,411				
<b>Savings Ratio</b>	7.0			5.6			5.8			6.2				
<b>Average Personal Tax Rate</b>	19.4			19.8			19.7			19.4				

Concerning food prices, there is a growing consensus that food price levels will be higher in the coming decade than in the previous decade.<sup>11</sup> This is a result of long-term demand led factors, such as increasing standards of living in emerging economies and the promotion of bio-fuel production. However, it is not expected that the current pace of food price inflation, which is primarily a result of short-term supply constraints, will be maintained. Food prices in Ireland increased by 7.8 per cent in May 2008 compared to May 2007, accounting for 18.6 per cent of the total change in the CPI over that period. As 2008 progresses we expect food prices to return to a more stable growth path.

There is less consensus on the outlook for oil prices over our forecast horizon. Prices for petrol, diesel and home heating oil have all increased significantly alongside the price of oil on international markets. Compared to May 2007, prices for these goods increased by 8.2, 23.3 and 47.4 per cent respectively in May 2008. With short-term supply constraints becoming apparent, it is likely that any significant fall in oil prices over our forecast horizon will have to come about as a result of muted demand growth. The projected slowdown in the developed market economies this year and next may provide such a scenario. However, strong demand growth in emerging Asia may counteract this. Similar to food prices, it is likely we are facing a period where oil price levels remain high in the coming years, however, their pace of increase could remain volatile. The appreciation of the euro against the US dollar is likely to mitigate the pass through of these commodity price increases to consumer price inflation, but only to a small degree (see Box below).

Using the EU *Harmonised Index of Consumer Prices* (HICP)<sup>12</sup> Ireland's inflation rate remains above the Euro Area as a whole. Inflation as measured by HICP averaged 3.1 per cent for the twelve months ending May 2008 in Ireland. The comparable rate for the Euro Area was 2.8 per cent. Given the rising prices in food and oil related products, our forecast for HICP inflation in Ireland is higher in 2008 relative to 2007 at 3.5 per cent. We expect this measure to moderate again next year, averaging 2.7 per cent on an annual basis.

**Table 12: Inflation Measures (%)**

	2002	2003	2004	2005	2006	2007	2008	2009
CPI	4.6	3.5	2.2	2.4	3.9	4.9	4.5	3.0
Mortgage Interest	-7.6	-8.3	5.4	12.3	31.4	40.4	16.5	5.3
HICP (Ireland)	4.7	4.0	2.3	2.2	2.7	2.9	3.5	2.7
HICP (Euro Area)	2.2	2.1	2.1	2.2	2.2	2.1	3.4	2.4

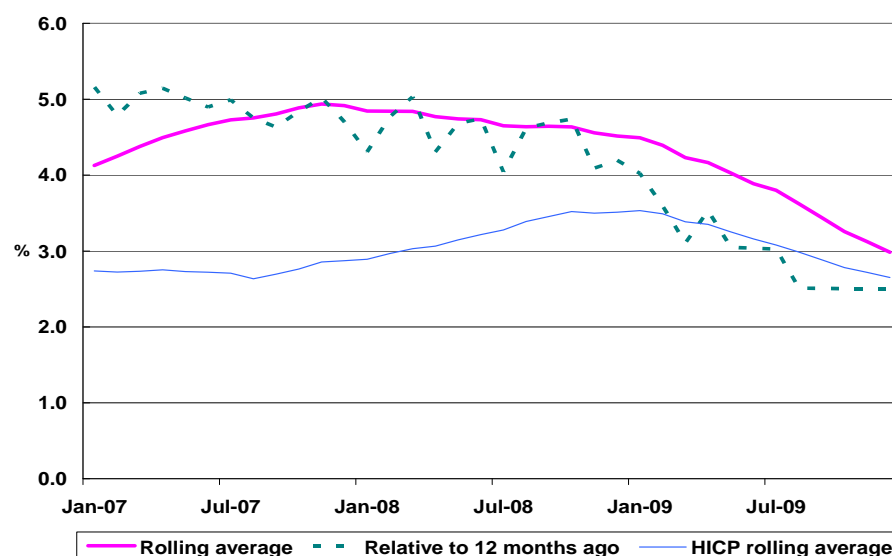
*Source:* Central Statistics Office, OECD and own forecasts.

<sup>11</sup> See the OECD-FAO *Agricultural Outlook 2008-2017*.

<sup>12</sup>The HICP excludes mortgage interest, building materials, concrete blocks, union subscriptions, motor car insurance, dwellings insurance, motor car tax and motorcycle tax.

Our forecast for CPI based inflation is particularly sensitive to our assumption on interest rates. With an assumption of a 25 basis points increase in the ECB main refinancing rate in July, our forecast for growth in the CPI in 2008 has risen to 4.5 per cent, moderating to 3 per cent in 2009. Should the current upside risks to inflation materialise the ECB may tighten rates further this year. In this scenario, with the ECB main refinancing rate rising to 4.5 per cent by the end of 2008, CPI inflation would rise to 4.6 per cent this year and 3.4 per cent in 2009. In general, however, we expect to see the pace of growth in the CPI and the HICP moderate over our forecast horizon (Figure 15).

**Figure 15: Inflation Profile 2007-2009 (Forecast 2008M05 Onwards)**



### Box: The Exchange Rate and Consumer Price Inflation

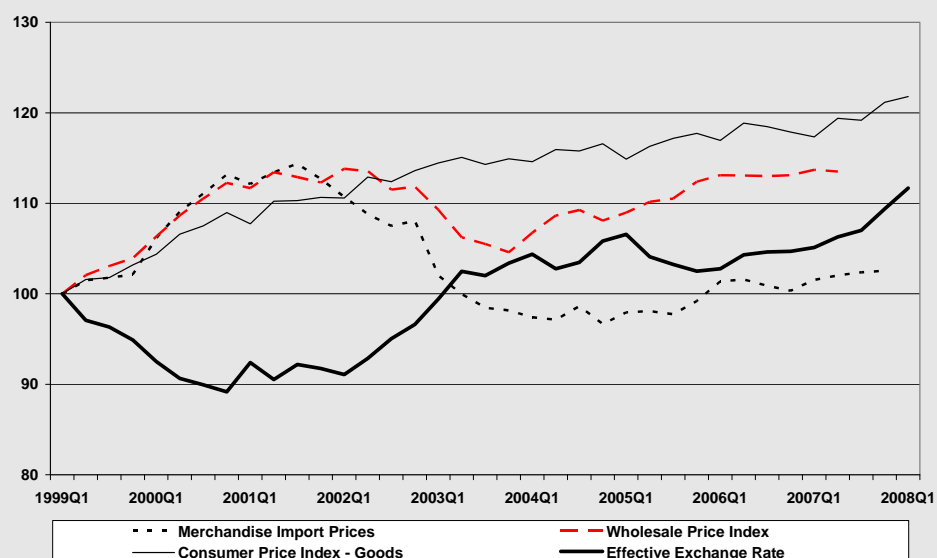
There has been much debate recently concerning the impact that should, or could be seen on headline rates of consumer price inflation given the strengthening of the euro against sterling and the US dollar. In the analysis presented below, we estimate the extent to which currency appreciation has fed through to consumer prices in Ireland in the past, and how we might expect the current strengthening of the euro to offset the inflationary pressures of rising commodity prices. Specifically, we distinguish between the speed and extent of exchange rate pass-through to domestic price inflation at the import, wholesale and consumer stages of the distribution chain.

To gauge appropriately the effects of exchange rate movements we use the trade-weighted *effective exchange rate*.<sup>13</sup> This measure of the exchange rate is shown below in Figure A, along with price indices for merchandise

<sup>13</sup> The index used here is the OECD measure for the nominal effective exchange rate, which reflects the greater levels of trade between Ireland, the US and UK relative to other Euro Area countries. We augment the OECD index to reflect exchange rate developments since 2007 Q3 using the Harmonised Competitiveness Indicator, produced by the Central Bank and Financial Services Authority of Ireland.

imports, wholesale prices and the goods component of the *Consumer Price Index*.

**Figure A: Exchange Rate and Price Developments, 1999-2008**



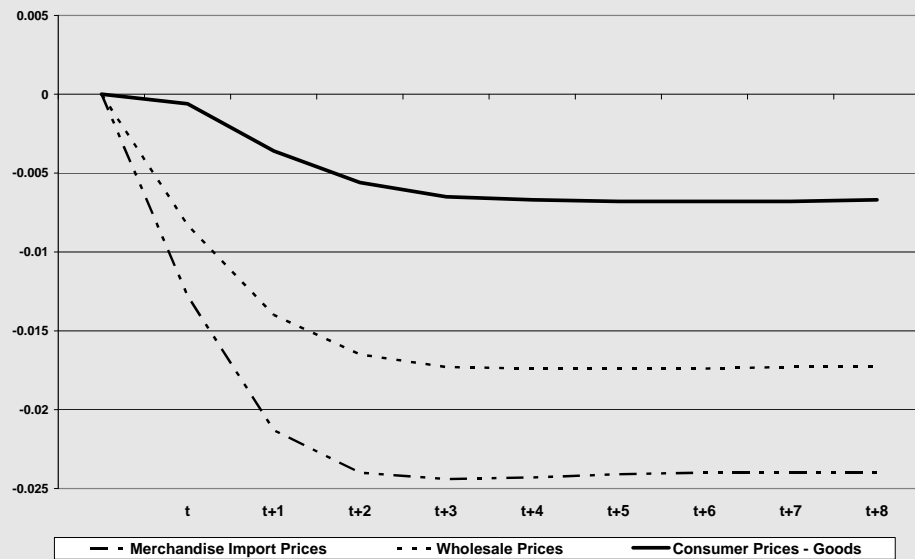
Source: OECD, CSO. All indices are rebased to 1999 Q1=100.

A preliminary analysis<sup>14</sup> on this issue yields some interesting results on the impact of changes in the pace of exchange rate appreciation on domestic price inflation along the distribution chain in Ireland. Figure B shows the impact over time on merchandise import price inflation, wholesale price inflation and consumer goods price inflation given an increase in the rate of exchange rate appreciation. The impact on merchandise and wholesale price inflation is much larger than that on consumer price inflation, and also tends to be much more quickly transmitted, with a significant amount of the impact being felt within 1 quarter. The full impact of the increase in the exchange rate appreciation on inflation further up the distribution chain is realised within 3 quarters. Meanwhile transmission to consumer price inflation is not fully completed until approximately 4 to 5 quarters have elapsed.

In Table A the results shown in Figure B above are expressed in terms of elasticities. As shown above, the responsiveness in merchandise import inflation and wholesale price inflation is much greater than that of consumer price inflation. Indeed there is full exchange rate pass-through for import price inflation within six months. Wholesale price inflation experiences almost complete pass through within the space of a year, although the elasticity (-0.94) is smaller than for import prices. In contrast, the responsiveness of consumer goods price inflation is much lower. When

<sup>14</sup> The analysis was undertaken using vector autoregression (VAR), which exploits the dynamic relationship between the effective exchange rate, merchandise import prices, wholesale prices, and consumer prices (goods). A proxy for world prices and seasonal dummies were also included. Data are quarterly in frequency and the estimation period is 1983 Q2 – 2007 Q2. Further details are available from the authors on request.

**Figure B: The Response of Import, Wholesale and Consumer (Goods) Price Inflation (by Quarter)\***



\*While the magnitude of these responses are not directly interpretable, their size relative to each other can be compared.

the effect of the initial 1 per cent change in the exchange rate appreciation is fully realised, which is after about 5 quarters, the accumulated impact on the consumer goods inflation rate is only -0.37 per cent. Given this, we may not expect to see the full benefit of the most recent strengthening of the euro, small though it may be, pass-through to consumer prices until early 2009.

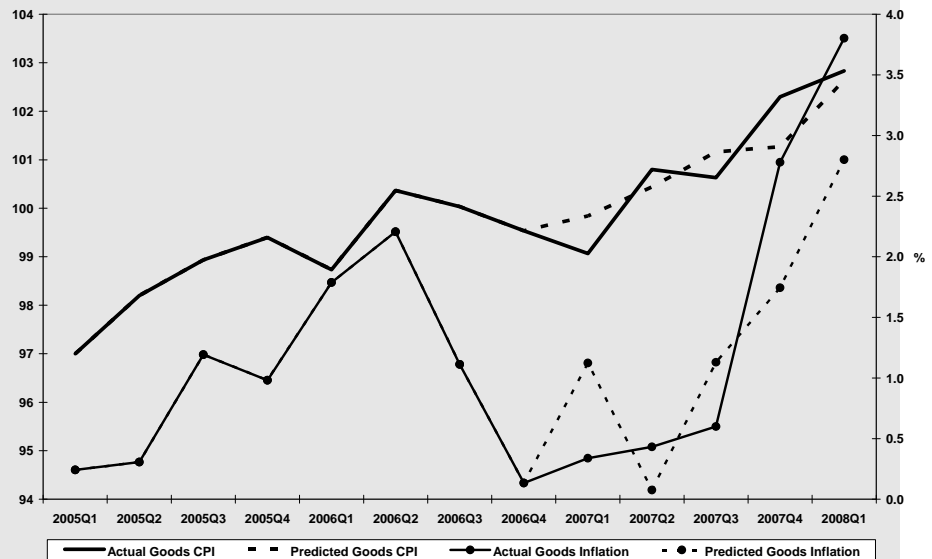
**Table A: Response to a 1 Per Cent Change in the Appreciation Rate of the Effective Exchange Rate**

Quarter	Merchandise Import Price Inflation	Wholesale Price Inflation	Consumer Price Inflation (Goods)
t	-0.69	-0.45	-0.03
t+1	-1.15	-0.76	-0.19
t+2	-1.30	-0.89	-0.30
t+3	-1.32	-0.94	-0.35
t+4	-1.31	-0.94	-0.36
t+5	-1.30	-0.94	-0.37
t+6	-1.30	-0.94	-0.37
t+7	-1.30	-0.94	-0.37
t+8	-1.30	-0.94	-0.37

Given that there is full, or at least near full, exchange rate pass through in terms of import and wholesale price inflation, the relatively small size of the effect on consumer prices may seem surprising. In general, however, lower pass-through rates for consumer price inflation than for price inflation further up the distribution chain is broadly consistent with the

academic literature on this issue.<sup>15</sup> Given the preliminary nature of this analysis, future research is warranted to fully explore current pass-through rates, in particular whether there is an asymmetric response to pass-through rates in response to an exchange rate appreciation and depreciation.

**Figure C: CPI and Inflation (Goods) Actual (2005 Q1-2008 Q1) and Predicted (2007 Q1-2008 Q1)\***



\*CPI left hand scale. Inflation right hand scale.

As a final step in our analysis it is possible to compare predicted consumer goods price inflation, and the corresponding goods price levels from our model with the actual inflation rate and CPI. This is presented in Figure C. As can be seen our predicted inflation rate is somewhat higher than the actual in Q1 and Q3 of 2007 by an average 0.6 per cent. However, since 2007 Q4 the actual rate of consumer goods price inflation is a full percentage point above what our prediction of inflation would be. Meanwhile the corresponding price levels by the end of our period of analysis are quite close. However, given their different paths over the preceding quarters, in that the rise of the predicted index has been more steady, it may be the case that pass through has been slower than usual in the most recent period. Combined with the inflation rate comparison this finding suggests that consumer price developments so far this year are not reflecting the recent appreciation of the euro to the same extent as in the past. While further analysis is required, this preliminary finding indicates that the deflationary benefits of a strengthening currency, small though they may be, are currently not being fully passed on to Irish consumers to the same degree as might be expected.

<sup>15</sup> See, for example, Choudri, E. *et al.*, 2005. "Explaining the Exchange Rate Pass-Through in Different Prices", *Journal of International Economics*, Vol. 65, No. 2, and Fitz Gerald, J. and F. Shortall, 1998. "Pricing to Market, Exchange Rate Changes and the Transmission of Inflation", *The Economic and Social Review*, Vol. 29, No. 4, 1998.

# GENERAL ASSESSMENT

The forecasts presented in this *Commentary* include a number of striking elements. First, we are forecasting a contraction in the economy in 2008. If this proves to be accurate, it would be the first contraction on a GNP basis since 1983. Second, we are forecasting a return to net outward migration in 2009. Again, such an outcome has not been seen at a significant level since the late 1980s.<sup>16</sup> Third, we are forecasting that the General Government Deficit will breach the 3 per cent mark set down in the Stability and Growth Pact. This has not happened since the SGP was agreed in 1997. These are all clearly worrying developments and thought needs to be given to how policy should be tailored to deal with the situation.

Looking first at the public finances, the figures we have presented are based on a rate of increase in public spending for 2009 that the government could view as excessive given the overall context. In principle, the government could choose to rein in expenditure or to increase taxes to such a degree that the 3 per cent limit would not be breached. We say “in principle” because the extent of the spending cuts or tax increases would be considerable. We think this would not be an appropriate course of action and that no dramatic action should be taken simply to achieve a deficit of below 3 per cent. We say this for a number of reasons.

First, it seems highly unlikely that Ireland would face any serious sanctions from the European Commission as a result of the 3 per cent threshold being breached, as long as it can be clearly demonstrated that the situation is temporary and related to particular problems in the economy that are unlikely to be repeated,<sup>17</sup> and that the government has a medium-term strategy to reduce the deficit. Given that much of the current problem facing Ireland is related to the house-building contraction, a case can be made that a structural change of sorts is underway and that this process should be completed by 2010. As discussed in the recently published *Medium-Term Review*, there are reasons to believe that the economy will return to its medium-term growth path in that year. As we have seen in the past, higher growth is the preferred route to bringing the deficit back below the 3 per cent mark.

<sup>16</sup> There were small levels of net outward migration in the mid-1990s, but never exceeding 5,000.

<sup>17</sup> However it should be said that under the Excessive Deficit Procedure (EDP), the government is required to reduce the deficit below 3 per cent within a year and to have demonstrated, through publicly announced decisions, its willingness to do so within six months of the Council of Ministers initiating the EDP.

Given that serious sanctions are unlikely to be imposed, the issue of whether dramatic efforts should be made to correct the deficit can be addressed solely with reference to the economic arguments. Generally, as severe curtailments in spending or increases in taxes in 2009 would tend to act against the economic recovery that we foresee, these should be avoided. More particularly, any moves to correct the public finances through an arbitrary slow down in the rollout of the National Development Plan should be avoided. It is crucial in this current difficult period that we do not lose sight of the need to ensure that Ireland's infrastructure continues to be developed so that long-run growth is facilitated. However, we would stress that projects should be prioritised by estimated rates of return and that the pursuit of value for money should remain a key objective while maintaining the planned levels of spending. A *sine qua non* for future prosperity is that all capital projects can be justified on a cost-benefit basis. We should also note that if the deficit in 2009 turned out to be larger than our current forecast corrective action would be called for.

While the general principle should apply of avoiding spending cuts or tax increases in the short-run simply in an effort to avoid breaching the 3 per cent mark, the government does need to be mindful of the medium-term imperative to bring the public finances back into balance.<sup>18</sup> Failure to do so would undermine future economic prosperity. A hugely important component here will be the containment of public sector pay. With unemployment rising in the private sector, a high degree of wage restraint is likely to emerge there through market forces. We would argue that any increases to public servants under the current pay round should reflect these likely developments in the private sector. While the argument will be made by public sector unions that allowance should be made for inflation, we would argue that the economy generally and the public finances in particular are in a vulnerable state and that national interests would be best served through wage restraint in the public sector.

With regard to the labour market more broadly, the upward moves in the rate of unemployment that we foresee bring back into focus the issue of how to ensure that short-term unemployment does not become long-term unemployment. While our forecasts do include an upturn in employment in the latter part of 2009, it would be a mistake to become complacent about the capacity of those who become unemployed in 2008 to take advantage of the employment increases in 2009. There are a number of reasons for this. First, the skill sets of those who are losing jobs at the moment may not match the skills required in the sectors with job growth in the near future. This is particularly likely to be the case among those who have lost their jobs in the construction sector. Second, the regional distribution of construction employment may imply a degree of regional imbalance between the unemployed and new job opportunities in the future. Third, earlier experience in Ireland suggests that a period of unemployment can, in itself, increase the probability of prolonged unemployment if general workplace-related skills depreciate during a period

<sup>18</sup> The *Medium-Term Review 2008-2013* assumes that fiscal policy is tightened in 2010 in order to eliminate the deficit (see page 89).



of unemployment. With these considerations in mind, it might be timely for the state's agencies with responsibility for education, training and job placement to ensure the delivery of effective programmes to those likely to experience difficulties in regaining employment.

It is clear that the economy is experiencing considerable difficulties right now. The forecast for the re-emergence of net outward migration is possibly the most vivid illustration of this and may give rise to comparisons with the 1980s. Given the likelihood of such comparisons, it is worthwhile stressing that the economy is better placed today to emerge from these difficulties than it was in the mid-1980s. However, a return to higher growth rates is predicated on ensuring that public expenditure is both efficiently provided and effectively managed. In such a context, a return to positive growth in 2009 and 2010, forecast both here and in the *Medium-Term Review*, can be expected with a reasonable degree of confidence, something which could not be said in the mid-1980s.

# SPECIAL ARTICLE<sup>\*</sup>

## Ireland's Innovation Performance: 1991 to 2005

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# IRELAND'S INNOVATION PERFORMANCE: 1991 TO 2005

Nola Hewitt-Dundas\* and Stephen Roper\*\*

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## Abstract

*In this paper we use data from the five waves of the Irish Innovation Panel (IIP) to profile the innovation performance of manufacturing plants in Ireland and Northern Ireland over the period 1991 to 2005. Despite considerable public sector investment on both sides of the border levels of innovation activity have remained broadly similar throughout this period although somewhat different trends are evident in Ireland and Northern Ireland. In terms of product innovation for example, the proportion of manufacturing plants making product changes has increased 5 per cent in Ireland and just over 7 per cent in Northern Ireland. In terms of process innovation a decline of almost 7 per cent in Ireland has been accompanied by a 7 per cent increase in Northern Ireland. These trends provide some evidence of convergence in innovation performance over the 1991 to 2005 period. This is evident in the narrowing gap between the proportion of product innovators in Ireland and Northern Ireland, convergence in the proportion of plants undertaking process innovation and in terms of the increasingly similar proportions of sales derived from innovative products.*

*Looking in more detail at the determinants of manufacturing innovation emphasises the importance of R&D and backwards supply chain linkages as sources of new knowledge for innovation. Other external linkages prove less important suggesting the value of policy initiatives designed to promote knowledge sharing. We also find a significant negative innovation effect from legislative restrictions on plants' product innovation. Public support for both product and process innovation are having positive effects on innovation outputs at the level of the individual plant. Future research interest centres on the contrast between this strong positive result at firm level and the more modest increases in innovation among the population of firms in Ireland and Northern Ireland.*

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## 1. Introduction

In this paper we use data from the five waves of the Irish Innovation Panel (IIP) to profile the innovation performance of manufacturing plants in Ireland<sup>1</sup> and Northern Ireland over the period 1991 to 2005. For much of this period promoting innovation and developing innovation capability, particularly among locally-owned firms, has been a priority of industrial policy in both Ireland and Northern Ireland backed by substantial public investment. A key question, therefore, is whether nearly two decades of policy intervention have been effective in improving firms' innovation performance.

In Ireland, the start of our innovation panel data coincides broadly with the publication of the Culliton report (1992). This provided an impetus for the prominence of technology development in industrial policy, being followed in 1995 by a review of science, technology and innovation policy in Ireland (STIAC, 1995), then in 1996 by Ireland's first government White Paper on *Science, Technology and Innovation*, and the subsequent establishment of the Irish Council for Science, Technology and Innovation (ICSTI). ICSTI's mandate was to advise the government on the direction of science and technology policy, including higher education, technology and R&D in industry, financing of innovation and public awareness. More recent policy developments have sought to further strengthen the indigenous innovative capability of Ireland through an upgrading of higher education institution (HEI) investments in R&D and measures designed to leverage higher levels of private R&D spending. For example, initiatives such as R&D tax credits were introduced in 2004 to increase the quantity of R&D performed by companies in Ireland and to encourage foreign companies to undertake R&D activities in Ireland. In relation to the upgrading of research in HEIs the Programme for Research in Third Level Institutions (PRTL), operated by the Higher Education Authority, was established in 1998 to support high quality basic research in third level institutions and Science Foundation Ireland (SFI) was established in 2001 with a focus on establishing world class research capability in niche areas of ICT and bio-technology.

More recent policy documents such as the Strategy for Science, Technology and Innovation (DETE, 2006) have emphasised the global positioning of Ireland's knowledge based economy with the aspiration that "...Ireland by 2013 will be internationally renowned for the excellence of its research, and will be to the forefront in generating and using new knowledge for economic and social progress, within an innovation driven culture" (DETE, 2006, p.21). Achieving this will require a multi-dimensional approach to innovation including enhanced education and skills, higher quality and quantity of research, greater exploitation of research activity for economic and social progress and the building-up of international networks (DETE, 2006).

In Northern Ireland the period we examine spans the formation of the Industrial Research and Technology Unit in 1992, the development of a range of innovation support measures in Northern Ireland through the 1990s, and the amalgamation of IRTU with the other development

<sup>1</sup>In this paper Ireland refers to Republic of Ireland.

agencies to form Invest NI in 2002.<sup>2</sup> Since its establishment Invest NI has emphasised innovation – broadly defined – as a central policy objective, introducing a range of new investment programmes to support this agenda. Pre-competitive research in the universities and research oriented companies has been supported through the Centres of Excellence and START programmes; near market innovation has been supported through the Compete programme; commercialisation of university research has been encouraged through the development of the higher education investment fund (HEIF) and more recently the development of a Proof of Concept Scheme. Alongside these local developments, R&D support measures at UK level have changed with the introduction of R&D tax credits in 2001. Since 2003, these initiatives have been set within the overall framework of Northern Ireland’s regional innovation strategy, entitled *Think, Create, Innovate* (DETI, 2003). This had as its key focus the better integration of public, private and higher education R&D efforts as well as the need to increase levels of R&D expenditure throughout the region. Most recently, developments in innovation policy in Northern Ireland have been the focus of a sub-committee of the Economic Development Forum, a social partnership body, which has met regularly to consider aspects of innovation development and performance in Northern Ireland.<sup>3</sup>

It is within the context of active innovation policy development in Ireland and Northern Ireland that our exploration of innovation performance is based. The remainder of this paper is organised as follows. In Section 2 we provide an overview of the Irish Innovation Panel (IIP) from which the data is derived. Section 3 compares innovation performance in Ireland and Northern Ireland over the 1991 to 2005 period both in aggregate and looking more specifically at externally-owned and locally-owned firms. In each case we are primarily concerned with how the level of innovative activity of each group of firms has changed through time and in any change in relative performance. We are less concerned with comparing, say, the innovative performance of externally-owned and locally-owned firms as this comparison will be strongly affected by differences in industrial composition. In Section 4 we focus on the determinants of innovation over the most recent three years covered by the IIP, 2003 to 2005. Section 5 draws some broad conclusions and highlights issues for future policy development.

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## 2. The Irish Innovation Panel

The Irish Innovation Panel (IIP) provides information on manufacturing plants’ technology adoption, networking and performance over the period 1991–2005. More specifically, the IIP comprises five surveys or waves conducted using similar survey methodologies and questionnaires with common questions (Roper *et al.*, 1996; Roper and Hewitt-Dundas, 1998; Roper and Anderson, 2000; Roper *et al.*, 2003). Each of the five surveys cover the innovation activities of manufacturing establishments with 10 or more employees over a three year period. For manufacturing each of the five surveys was undertaken by post using a sampling frame provided by the economic development agencies in Ireland and Northern Ireland. In

<sup>2</sup>For example, an Innovation Relay centre was opened in 1993, the Design Directorate was started in 1995 and in 1996 the Manufacturing Technology Partnership was created with the aim of promoting technology transfer between smaller companies and higher education.

<sup>3</sup> See [www.edfni.com](http://www.edfni.com) for committee minutes etc.

each case samples were structured with higher sampling proportions among larger plants with weighting structures being developed to provide representative results for Ireland and Northern Ireland.<sup>4</sup>

The initial wave of the IIP, undertaken between October 1994 and February 1995, related to plants' innovation activity over the 1991 to 1993 period, and achieved a response rate of 38.2 per cent (Roper *et al.*, 1996; Roper and Hewitt-Dundas, 1998, Table A1.3). The second wave, conducted between November 1996 and March 1997, covered plants' innovation activity during the 1994-96 period, and had a response rate of 32.9 per cent (Roper and Hewitt-Dundas, 1998). The third wave covering the 1997 to 1999 period was undertaken between October 1999 and January 2000 and achieved an overall response rate of 32.8 per cent (Roper and Anderson, 2000). The fourth wave was undertaken between November 2002 and May 2003 and achieved an overall response rate of 34.1 per cent. The fifth wave of the IIP, conducted between January and June 2006, had an overall response rate of 28.7 per cent. Taken together the five waves of the IIP comprise an unbalanced panel reflecting firms' non-response but also the closure and opening of manufacturing units over the 15 year period covered by the panel. The panel itself contains 4,525 observations from 2,564 establishments and represents an overall response rate of 33.2 per cent (Northern Ireland, 39.1 per cent; Ireland 30.5 per cent).

Innovation in the IIP is represented by a range of indicators reflecting the extent of innovative activity within the overall population of firms as well as the quality and success of firms' innovative activity. Four indicators are discussed here. First, we consider the extent of product innovation activity within the overall population of manufacturing plants in Ireland and Northern Ireland. In the IIP a plant is said to be a product innovator if it introduced any new or improved product over the previous three years.<sup>5</sup> In the most recent wave of the IIP relating to plants' innovative activity over the 2003 to 2005 period (the IIP5), 65 per cent of manufacturing plants were product innovators (Ireland, 68 per cent; Northern Ireland, 59 per cent). The second innovation indicator relates to the extent of process innovation activity within the population of manufacturing plants. Again, a plant is said to be a process innovator if it introduced any new or improved process during the previous three years. In the IIP5 (2003 to 2005), 52 per cent of manufacturing plants were process innovators (Ireland, 51 per cent; Northern Ireland, 53 per cent). The other two innovation indicators discussed here relate to the proportion of plants' sales derived from (a) products newly introduced during the previous three years, and (b) products either improved or newly introduced during the previous three

<sup>4</sup> In fact sampling fractions were high: 100 per cent for firms with more than 100 employees; 75 per cent for firms with 50-100 employees; and 50 per cent for those with 10-50 employees. Non-response telephone surveys were also conducted for each IIP wave until 2002 with no bias evident in terms of the innovativeness of respondent firms. Representativeness is discussed in more detail in the survey reports cited in the text (e.g. Roper and Hewitt-Dundas, 1998).

<sup>5</sup> This definition is considerably less demanding than the definition of technological innovation used in the Community Innovation Survey which requires that an innovation is a 'significant' technological improvement. In the IIP we adopt a less demanding approach to reflect a broader range of innovative activity including more of the incremental innovation typically undertaken by smaller firms.

**Table 1: Innovation Activity and Innovation Success, Ireland, Northern Ireland and All Island, 1991-2005**

	1991-1993	1994-1996	1997-1999	2000-2002	2003-2005
<b>Ireland</b>					
Product Innovators (% of plants)	62.8	65.9	65.3	56.7	67.9
Process Innovators (% of Plants)	n/a	57.7	65.8	53.9	51.0
Sales from New Products (% sales)	30.2	21.9	27.7	24.3	22.6
Sales from New and Improved Products (% sales )	46.4	40.3	40.4	40.3	34.2
<b>Northern Ireland</b>					
Product Innovators (% of plants)	51.9	56.5	58.5	53.8	59.3
Process Innovators (% of Plants)	n/a	46.0	57.5	50.1	53.0
Sales from New Products (% sales)	27.2	22.7	21.3	25.8	24.1
Sales from New and Improved Products (% sales )	48.7	37.5	39.2	38.6	36.8
<b>All Island</b>					
Product Innovators (% of plants)	59.2	62.9	63.3	55.8	64.7
Process Innovators (% of Plants)	n/a	53.9	63.4	52.7	51.8
Sales from New Products (% sales)	29.3	22.2	25.9	24.7	23.1
Sales from New and Improved Products (% sales )	47.1	39.4	40.1	39.8	35.1

*Notes and Sources:* Observations are weighted to give representative sources. All data from the IIP.

years.<sup>6</sup> Both of these measures reflect not only plants' ability to introduce new products to the market but also their short-term commercial success. On average among product innovators, 23 per cent of plants' sales were derived from new products in the IIP5 with 35 per cent being derived from new and improved products (Table 1).

In addition to the innovation indicators the IIP also provides information on a wide range of variables which previous studies have suggested may contribute to plants' innovation performance. These include a range of indicators relating to the structure and nature of plants' R&D activity, the nature of their production activities, knowledge sourcing behaviour, their resource base, absorptive capacity and plants' receipt of government support. The IIP also includes a range of accounting and business growth information which has been used to examine the relationship between innovation and aspects of business performance<sup>7</sup> as well as information on the barriers to innovation (e.g. Hewitt-Dundas, 2006).

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### 3. Trends in Innovation Performance

Key indicators of Ireland and Northern Ireland's innovation performance over the 1991 to 2005 period are summarised in Table 1. Perhaps the most striking feature of these figures is the relative stability of the proportion of innovating plants in both Ireland and Northern Ireland given the rapid development of the two economies over this period. For example, in Ireland 62.8 per cent of plants stated that they had introduced new or improved products during the 1991 to 1993 period, while by 2005 this proportion had risen only marginally to 67.9 per cent. In Northern Ireland, 51.9 per cent of plants reported introducing new or improved products in the first wave of the IIP covering the 1991 to 1993 period, rising to 59.3 per cent by 2003 to 2005. Two points stand out here. First, the proportion of the population of manufacturing plants introducing product innovations was consistently higher in Ireland than in Northern Ireland over this entire period (Figure 1A). Second, the proportion of product innovating plants in Northern Ireland increased at a faster rate than that in Ireland over the 1991 to 2005 period, narrowing the gap in innovation rates slightly from around 11 pp to less than 9 pp by 2005 (Table 1). A more marked pattern of convergence is seen in process innovation, with the extent of process innovation higher in Ireland from 1994 to 2002, over the 2004 to 2005 period Ireland was surpassed by Northern Ireland (Figure 1B).<sup>8</sup>

During the 1991 to 2005 period, of course, the international economic environment changed radically, with rapid expansion during the later-1990s followed by the high-tech downturn around the millennium, and subsequent recovery. Each of these phases of activity are reflected in the innovation activities of Irish companies. From 1991 to 1999, for example,

<sup>6</sup> By 'new' here we mean that the product was newly introduced by the plant. In the IIP we distinguish between products which are new to the world and those which were previously produced elsewhere but do not make this distinction here.

<sup>7</sup> On exporting see Roper *et al.*, 2006; on growth and productivity see Roper *et al.*, 2006; and on profitability see Love *et al.*, 2007.

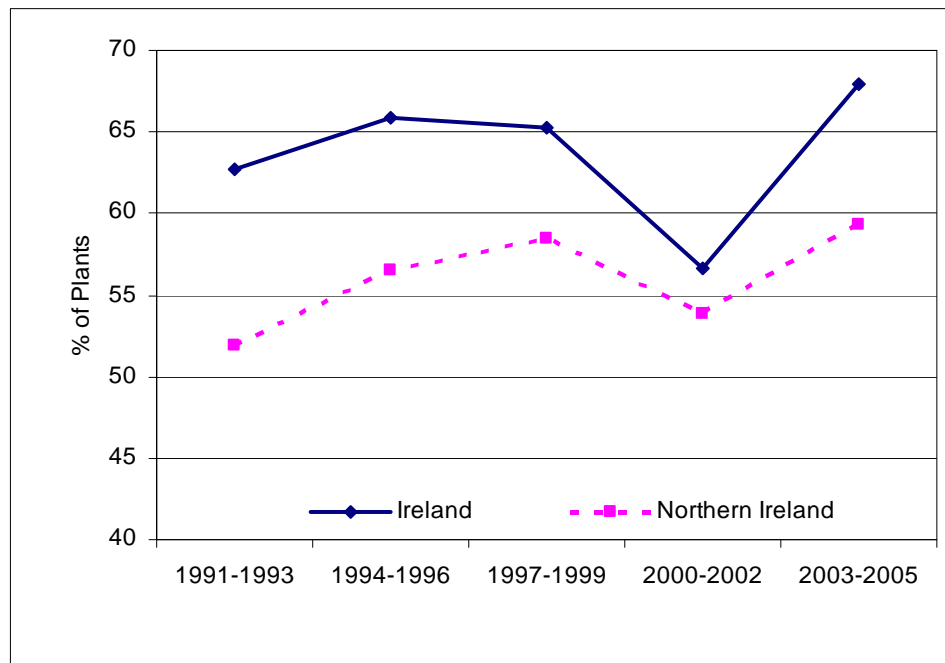
<sup>8</sup> Over the 1991 to 2005 period around 70 per cent of plants undertaking product innovation in any period also reported process innovation. See Roper and Hewitt-Dundas (1998) for a discussion.



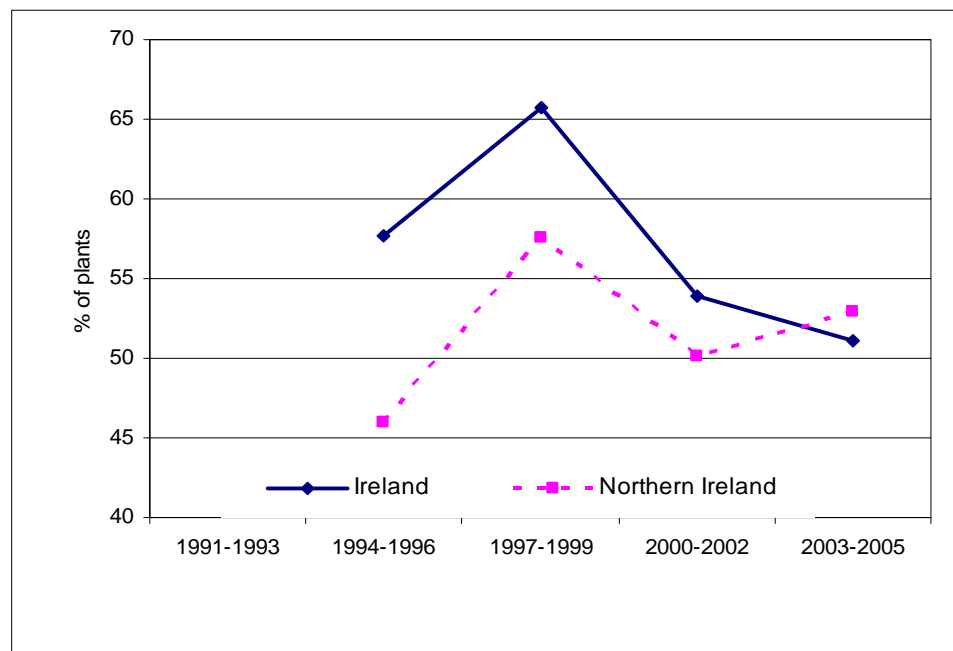
through the first three waves of the IIP we see steady growth in the extent of product and process innovation in relatively benign market conditions. In the 2000 to 2002 period, however, we see a downturn in innovation rates with markedly fewer plants introducing product or process innovations over this period than during the previous three years (Figure 1). This downturn in innovation rates occurred across almost all industrial sectors, all plant size bands and affected both Ireland and Northern Ireland (Roper *et al.*, 2003). The fall in product innovation rates was, however, notably greater in Ireland than in Northern Ireland (Figure 1A) perhaps reflecting the greater exposure of the Irish economy to high-tech sectors over this period.

**Figure 1: The Extent of Product and Process Innovation: 1991-2005**

**A. The Extent of Product Innovation (% of Plants)**



**B. The Extent of Process Innovation (% of Plants)**



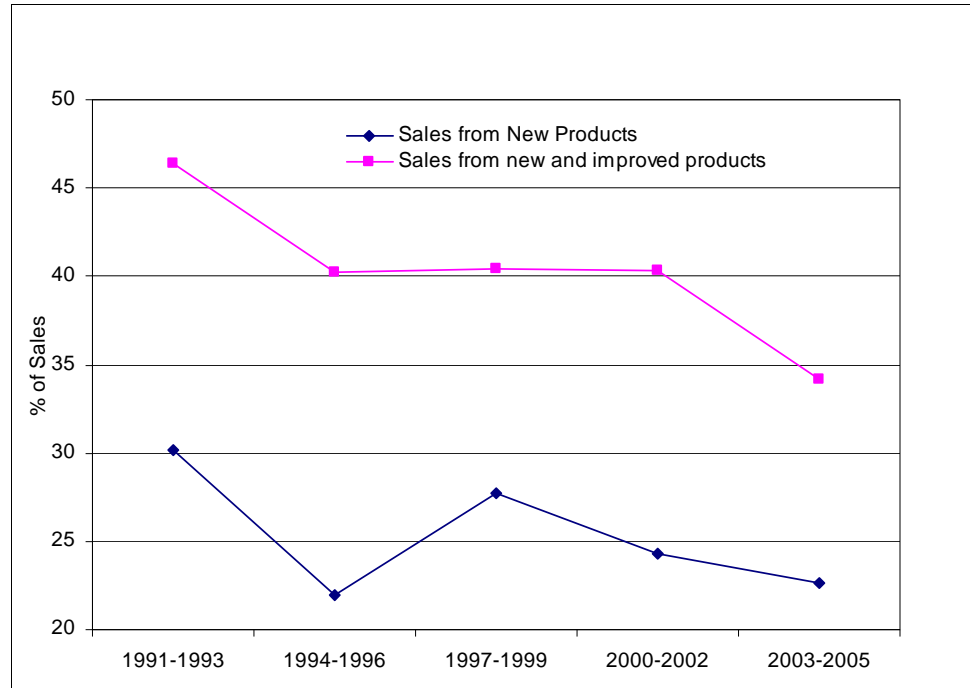
During 2003 to 2005 we then see a sharp recovery in product innovation rates in both Ireland and Northern Ireland with both economies achieving historical highs in terms of the proportion of plants engaged in product innovation (Figure 1A). In terms of process innovation, however, both economies perform less strongly with process innovation rates failing to match those of the late-1990s. In Ireland, in particular, the proportion of plants engaging in process innovation actually continued to fall over this period. This contrasts sharply with increases in process innovation activity in Northern Ireland and Irish plants' renewed enthusiasm for product innovation. One possibility is that this marks something of a change in the nature of product innovation in Ireland with a shift towards more incremental product innovation which does not require related process change. This possibility is also suggested by a slight decline in the proportion of innovating plants' sales – innovation success – coming from new products over the 2002 to 2005 period while the proportion of sales coming from new and improved products remained relatively stable (Figure 2A). In Northern Ireland, a slightly different trend is evident here with sales of new innovative products increasing in importance post-2002, and sales of improved products declining in importance (Figure 2B). This again provides some tentative evidence for convergence over the post-2002 period with Ireland moving towards more incremental product development and Northern Ireland plants increasingly emphasising the development of new products.

Within this general pattern it is also interesting to examine how levels of innovative activity have changed among locally-owned and externally-owned plants over the 1991 to 2005 period. Direct comparison of the innovation performance of the two groups of plants are likely to be misleading, largely due to marked differences in the size and sectoral structure of the two groups. Instead, our focus here is on the temporal profile of innovation within each group and we return to the question of the relative 'innovativeness' of locally-owned and externally-owned plants in the context of the multivariate analysis in Section 4.

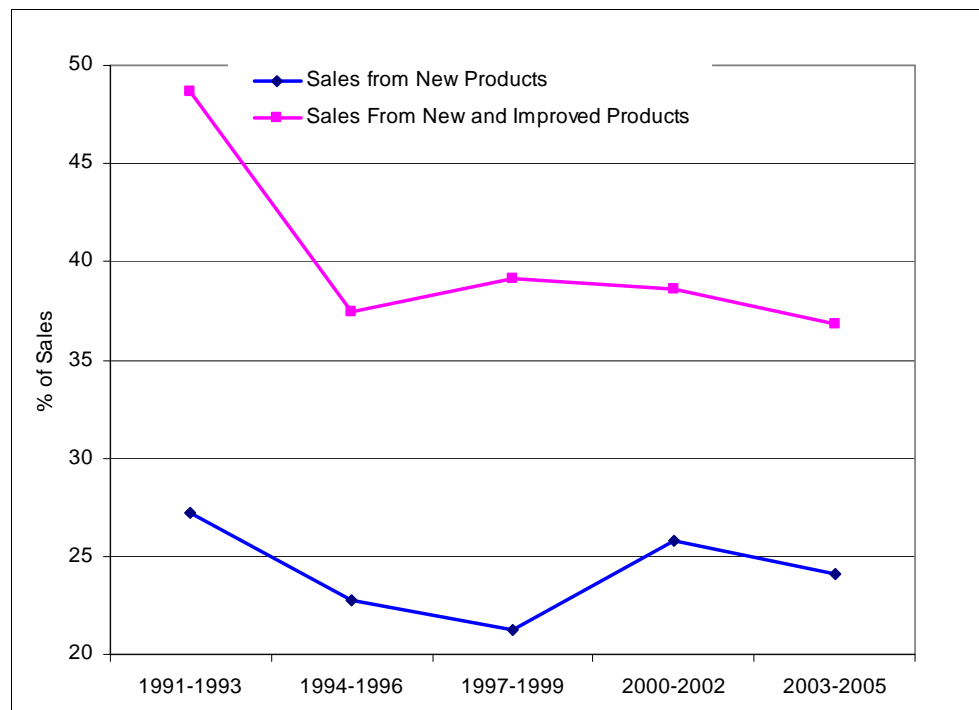
Looking first at the proportion of locally-owned plants in Ireland engaging in product innovation, it is clear that trends for this group follow the aggregate pattern with a sharp downturn 2000 to 2002, and recovery during 2003 to 2005 period to reach an all time high (Figure 3A). The proportion of locally-owned plants undertaking product innovation in Northern Ireland also reached an all time high over the 2003 to 2005 period but it is notable that product innovation among this group of plants was relatively unaffected by the downturn during 2000 to 2002 (Figure 3A). Over the whole 1991 to 2005 period, some convergence is evident between the proportions of locally-owned plants engaging in product innovation in Ireland and Northern Ireland, except for the trough of 2000 to 2002. In terms of process innovation, we see clearer evidence of long-term convergence, with small falls in the proportion of locally-owned plants undertaking process innovation in both areas over the 2003 to 2005 period (Figure 3B).

**Figure 2: Innovation Success – The Proportion of Sales from Innovative Products**

**A. Ireland**

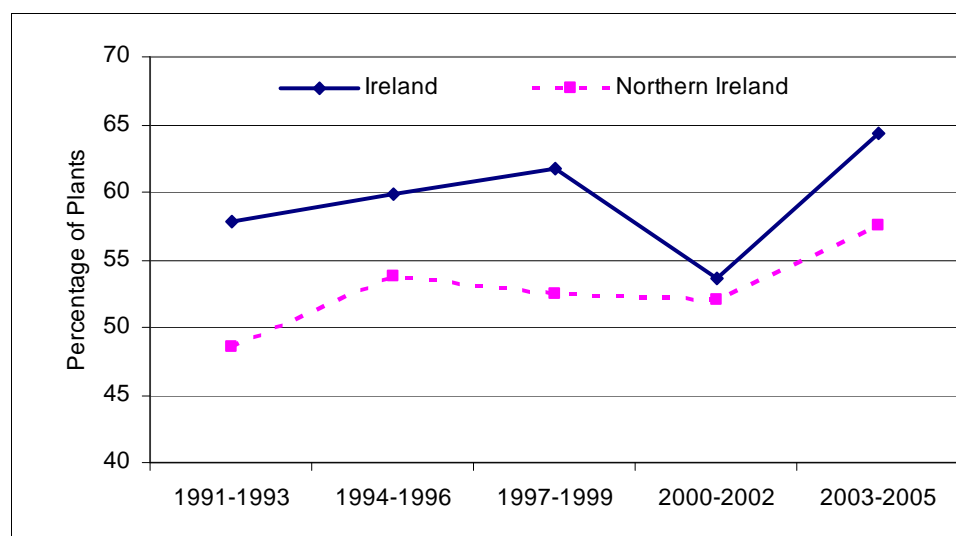


**B. Northern Ireland**

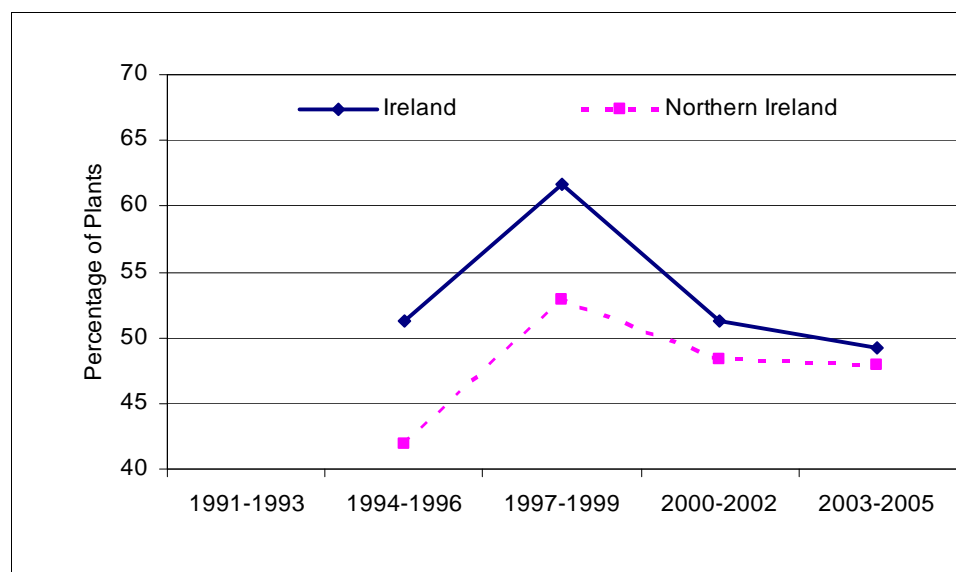


**Figure 3: The Extent of Product and Process Innovation: Locally-owned Plants**

**A. Product Innovation**



**B. Process Innovation**

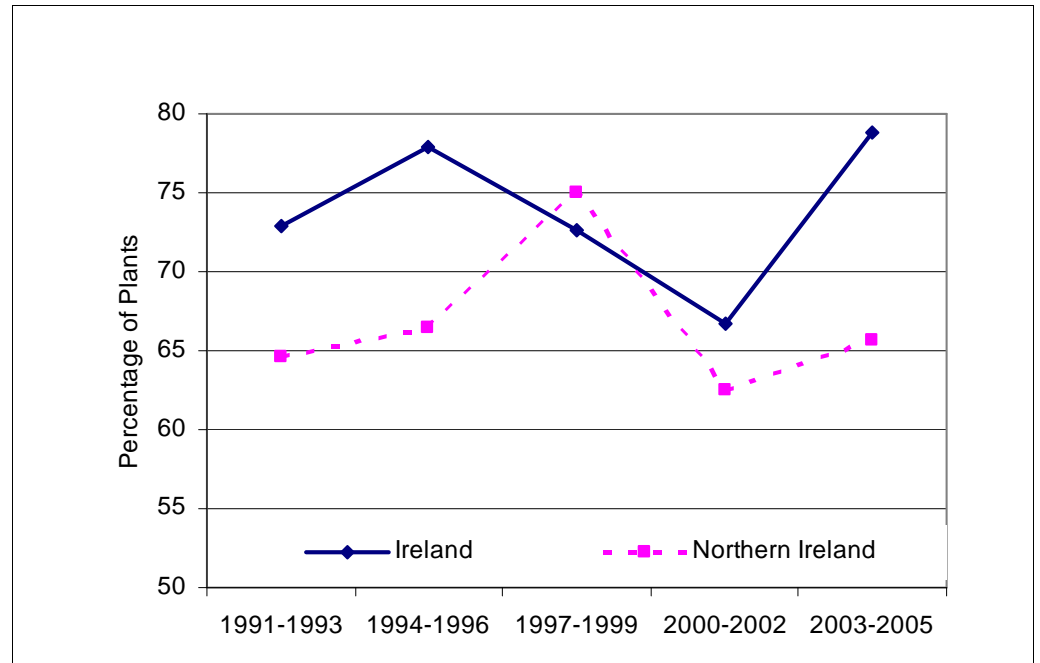


Externally-owned plants exhibit a somewhat more variable picture in terms of innovation rates over the 1991 to 2005 period (Figure 4). In terms of the proportion of externally-owned plants engaging in product innovation, for example, we see falls in both jurisdictions in 2000 to 2002 but a much stronger subsequent 'bounce back' in Ireland (Figure 4A). In terms of process innovation, however, we see a continued weakening among the proportion of externally-owned plants in Ireland in contrast to a sharp increase in Northern Ireland (Figure 4B). As suggested earlier the implication is that an increasing proportion of externally-owned plants in Ireland were undertaking product innovation over this period using existing process technologies rather than upgrading both together. This is likely to result in incremental rather than radical product change and this is reflected

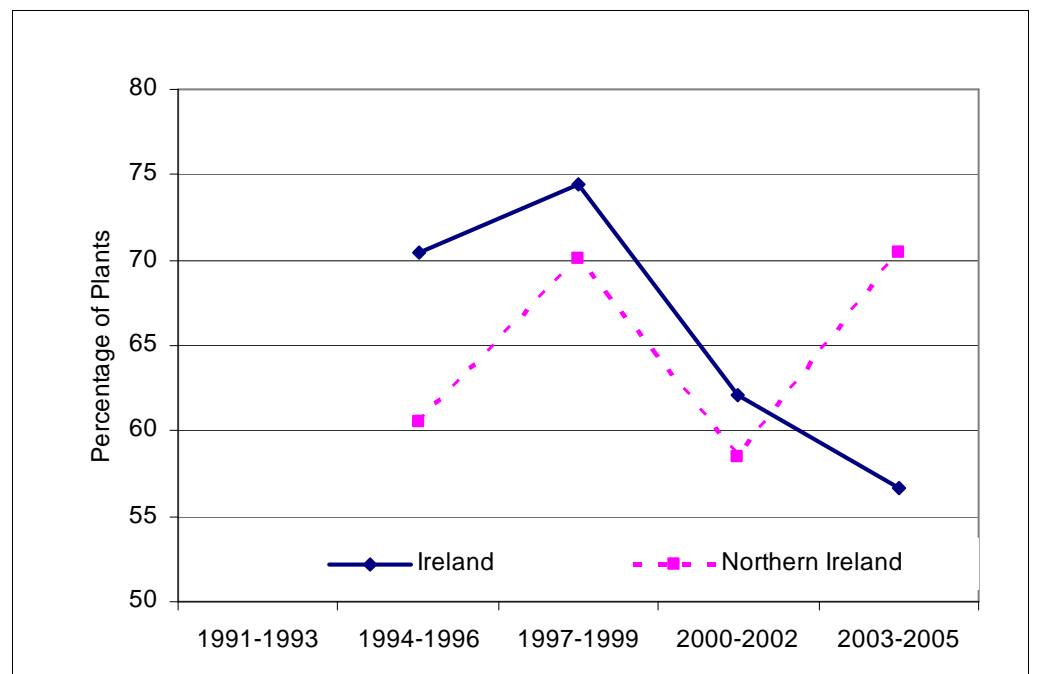
in a decline in the proportion of sales derived from new products by externally-owned plants in Ireland from 2000 to 2005 (Table 2).

**Figure 4: The Extent of Product and Process Innovation: Externally-owned Plants**

**A. Product Innovation**



**B. Process Innovation**



**Table 2: Innovation Activity and Innovation Success in Indigenous and Foreign-owned Plants in Ireland and Northern Ireland, 1991-2005**

	1991-1993	1994-1996	1997-1999	2000-2002	2003-2005
<b>A. Locally-owned Plants – Ireland</b>					
Product Innovators (% of plants)	57.8	59.8	61.8	53.6	64.3
Process Innovators (% of Plants)	n/a	51.3	61.7	51.3	49.2
Sales from New Products (% sales)	29.8	19.3	26.7	23.0	21.8
Sales from New and Improved Products (% sales )	44.5	39.3	39.2	39.4	32.5
<b>B. Locally-owned Plants – Northern Ireland</b>					
Product Innovators (% of plants)	48.5	53.7	52.4	52.0	57.5
Process Innovators (% of Plants)	n/a	41.9	52.9	48.4	47.9
Sales from New Products (% sales)	28.1	22.7	20.8	24.9	23.6
Sales from New and Improved Products (% sales )	49.6	37.6	38.5	38.8	36.6
<b>C. Externally-owned Plants – Ireland</b>					
Product Innovators (% of plants)	72.92	77.96	72.6	66.7	78.8
Process Innovators (% of Plants)	n/a	70.4	74.4	62.1	56.6
Sales from New Products (% sales)	30.7	26.1	29.7	27.9	24.5
Sales from New and Improved Products (% sales )	49.2	41.7	42.6	42.7	38.5
<b>D. Externally-owned Plants – Northern Ireland</b>					
Product Innovators (% of plants)	64.6	66.4	75.0	62.5	65.6
Process Innovators (% of Plants)	n/a	60.5	70.1	58.5	70.4
Sales from New Products (% sales)	25.0	22.9	22.3	29.8	25.4
Sales from New and Improved Products (% sales )	46.3	37.2	40.4	38.1	37.4

*Notes and Sources:* Observations are weighted to give representative sources. All data from the IIP.

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#### 4. The Determinants of Manufacturing Innovation: 2003 to 2005

In this section we outline some illustrative models of the determinants of the extent of product and process innovation, and our two indicators of innovation success for the 2003 to 2005 period. We choose to focus here on the most recent cross-section of the IIP as being of most contemporary relevance, with broadly similar results for the IIP as a whole given in Roper *et al.* (2008).

The models reported here are based on the notion of an innovation production function in which knowledge sourced by the enterprise (KS) is translated into innovation outputs (e.g. Geroski, 1990; Harris and Trainor, 1995; Jordan and O’Leary, 2007; Arvanitis and Wörter, 2006), and in which the effectiveness of firms’ knowledge transformation activity is influenced by the strength of their resource-base (RI), barriers to innovation (BAR), and receipt of government assistance (GOVT). In general terms where  $I_i$  is an innovation output indicator we write the innovation production function as:

$$I_i = \phi_0 KS_{ki} + \phi_1 RI_i + \phi_2 BAR_i + \phi_3 GOVT_i + \varepsilon_i \quad (1)$$

Where plants’ internal resources are strong, for example, we would expect this to contribute positively to the efficiency with which plants develop new innovations (e.g. Crépon *et al.*, 1998; Lööf and Heshmati, 2001 and 2002). We would also expect plants’ innovation outputs to be negatively related to barriers to innovation and positively related to the receipt of government assistance (e.g. Roper and Hewitt-Dundas, 2005; Link *et al.*, 2005). We also include in the innovation production functions industry measures and a dummy variable indicating whether an establishment is in Northern Ireland. The appropriate estimation method for the innovation production function depends primarily on the nature of the dependent variable. For the extent of product and process innovation bivariate Probit models are appropriate, while for the two innovation success variables (which are percentages) we use a bounded Tobit estimator.<sup>9</sup>

Estimates of Equation (1) based on the fifth wave of the IIP (IIP5, 2003 to 2005) are reported in Table 3 for all manufacturing plants with marginal values reported for each variable. Variable definitions and descriptives are summarised in the data annex. In terms of the extent of innovation, we see strong positive R&D effects on both product and process innovation as well as innovation success. Having in-house R&D increases the probability that a plant is engaging in product innovation by 30 per cent and the probability that a plant will engage in process innovation by 19.4 per cent. It also increases the share of plants’ sales accounted for by new products by around 11 per cent and sales of new and improved products by 23.4 per cent (Table 3). These impacts suggest the value of current attempts both in Ireland and Northern Ireland to boost levels of business R&D<sup>10</sup> which are currently only a fraction that in Denmark

<sup>9</sup> A range of econometric issues arise in estimating this type of innovation production function and we discuss these extensively elsewhere (Roper *et al.*, 2008).

<sup>10</sup> In Ireland increasing the number of R&D active businesses and the level of investment in R&D is reflected in the Government’s Strategy for Science, Technology and Innovation 2006-2013. In Northern Ireland a similar emphasis is found in the Regional Innovation Strategy (DETI, 2003).

and a third of that in Finland and Israel.<sup>11</sup>

Our results provide some, more limited, evidence of other positive external linkages as part of plants' innovation activity. Plants having backward linkages to either suppliers or consultants as part of their innovation activity, for example, are 11-12 per cent more likely to engage in product and process innovation and have higher innovation success than plants without such linkages (see also Tan, 1990; Wong, 1992). Other aspects of plants' innovation linkages – to other group companies, customers and public knowledge institutions – prove less important in shaping the extent and success of innovative activity (Table 3). The suggestion is that contrary to the ideal of the open innovation model (Chesborough 2003; 2006) manufacturing innovation in Ireland is driven by a relatively narrow range of external knowledge sources aside from knowledge created within the plant through R&D. This may, in part at least, be a consequence of the low level of business R&D spending in Ireland which may be reducing plants' absorptive capacity and hence their ability to benefit from external knowledge sources (e.g. Griffith, Redding, and Van Reenan, 2003). Of particular importance perhaps given the emphasis of current policy is the lack of any positive link between the extent of innovation activity and links to public knowledge sources (see also Jordan and O'Leary, 2007). This may reflect the fact that engagement with universities takes longer to yield benefits in terms of innovation than other types of external linkages, or that the benefits to plants from university interaction depend on their innovation strategy (Arvanitis and Wörter, 2006). In the context of current increases in investment in higher education R&D in Ireland, however, and in terms of planned increases in higher education R&D in Northern Ireland this result seems worthy of further investigation.

Different aspects of plants' resource base – reflecting plant size, ownership profile and skills base – prove important for different dimensions of innovation activity. Plant size, for example, only proves significant for the probability of process innovation with no significant effect either on the probability of product innovation or either measure of innovation success (Table 3). As in previous studies (e.g. Roper *et al.*, 2008) we see a non-linear inverted 'U' shape relationship between the probability of process innovation and plant size. Plant age and the proportion of graduates in the workforce prove unimportant for innovation, although other studies have suggested that graduate employment is perhaps more important in exploiting rather than creating product and process innovations (e.g. Roper *et al.*, 2006). Unsurprisingly perhaps given the discussion of Section 3, externally-owned plants, and those with access to group R&D, are also more likely to be undertaking product innovation, although these effects are balanced by a negative impact from being part of a multi-site business. No significant ownership effects are observed in relation to process change, however. These results suggest a marked contrast between the determinants of product and process change: product innovation and innovation success are largely unrelated to plant size but

<sup>11</sup> See for example, Research and Development Performance in the Business Sector Ireland: 2005/06, Figure 5, Forfás, 2007.



**Table 3: Determinants of Manufacturing Innovation Performance: 2003-2005**

Model	Product Innovation		Process Innovation		New Products as % Sales Success		New and Improved Products as % Sales	
	dy/dx	t-stat	dy/dx	t-stat	dy/dx	t-stat	dy/dx	t-stat
<b>Knowledge Sourcing</b>								
Research and development	0.301	6.810	0.194	3.890	11.093	3.230	23.358	5.580
Other group members	-0.083	-1.010	-0.037	-0.460	-4.507	-0.850	-1.230	-0.200
Backwards linkages	0.110	1.800	0.107	1.690	8.793	1.840	8.747	1.560
Forwards linkages	0.076	1.070	0.124	1.820	6.722	1.470	10.539	1.840
Horizontal linkages	-0.045	-0.510	0.076	0.980	0.419	0.080	-1.831	-0.310
Public knowledge sources	-0.062	-0.770	0.040	0.570	-8.894	-2.200	-10.324	-1.940
<b>Resource Base</b>								
Employment (2002)	0.000	0.000	0.002	3.700	0.026	0.620	0.049	0.980
Employment Squared (2002)	0.000	-0.040	-0.003	-2.920	-0.022	-0.460	-0.053	-0.810
Established post 2000	0.014	0.160	-0.019	-0.210	10.664	1.460	10.857	1.320
Externally-owned firm	0.199	2.980	-0.106	-1.080	7.465	1.390	16.030	2.430
Part of multi-plant group	-0.215	-2.450	0.055	0.570	-7.625	-1.410	-15.030	-2.230
Important group R&D	0.170	2.950	0.087	1.040	7.127	1.270	8.617	1.340
Graduates in the workforce (%)	0.000	-0.180	0.000	0.170	0.144	1.300	0.112	0.820
<b>Barriers to Innovation</b>								
Risk of investment	0.024	0.410	-0.005	-0.080	6.946	1.950	4.835	1.030
Low rate of return	0.036	0.620	-0.053	-0.830	-1.032	-0.290	3.520	0.740
Attitudinal barriers in plant	0.105	1.510	0.173	2.290	3.386	0.780	2.793	0.530
Lack financial resources	0.009	0.160	-0.037	-0.620	4.449	1.200	3.166	0.650
Lack information	-0.036	-0.520	-0.036	-0.460	6.546	1.420	4.067	0.710
Regulatory barriers	-0.062	-1.060	-0.051	-0.760	-7.441	-1.920	-6.313	-1.250
Lack partners	-0.122	-1.730	-0.129	-1.640	-10.400	-2.310	-12.457	-2.060
Technical skill barriers	0.003	0.050	0.091	1.160	1.116	0.270	3.167	0.630
Managerial skill barriers	-0.057	-0.790	-0.030	-0.360	-4.090	-0.900	-5.115	-0.910
<b>Government Assistance</b>	0.223	4.680	0.274	4.510	17.956	4.450	16.394	3.460
<b>Industry Dummies</b>								
Food and textiles	-0.018	-0.310	-0.057	-0.880	-4.049	-1.110	-5.268	-1.190
Materials based industry	-0.050	-0.890	0.007	0.120	-10.483	-2.530	-12.164	-2.430
Machinery and equipment	-0.009	-0.140	-0.007	-0.100	-2.692	-0.580	0.098	0.020
<b>Northern Ireland</b>	-0.098	-2.050	0.008	0.150	-3.932	-1.250	-4.990	-1.270
Observations	740		740		689		686	
Chi <sup>2</sup> (20)	110.97		143.91		5.16		6.09	
Likelihood	-385.50		-424.36		-12,631.98		-13,637.14	
R <sup>2</sup>	0.193		0.173		0.037		0.038	

*Notes and Sources:* Observations are weighted to give representative sources. All data from the IIP. The omitted industry dummy variables relate to chemicals and electronic and electrical engineering (NACE 24, 30-34). Industry dummies reported relate to: food and textiles (Nace 15-19); Materials based industry (Nace 20-26, 36-37); Machinery and equipment (Nace 27-29).

sensitive to ownership and organisational context, while process change is more strongly related to plant size but less sensitive to plants' organisational setting. In policy terms this suggests the type of plant characteristics which might either enhance or negate public support for plants' innovation activity. This is important because public support for innovation proves important in our analysis both in increasing the probability that a plant is engaging in product and process innovation as well as innovation success. Public support for innovation is associated with an increase of around a fifth in the probability that a plant will be innovating and an increase in sales of innovative products of around 17 per cent (Table 3). Some care is necessary in interpreting the policy implications of this result, however, as the coefficients on the policy support – treatment terms – essentially reflect the combination of 'assistance' and 'selection' effects rather than a pure policy effect (see the discussion in (Wooldridge 2002; Greene 2005)).<sup>12</sup> Again, given its importance, this is an area where, to date, there has been surprisingly little best practice evaluation of the effectiveness of innovation support being provided by development agencies in either Ireland or Northern Ireland.

We also include in the innovation models a range of indicators intended to identify specific barriers to innovation. These are important as they suggest those aspects of plants' operating environments which may be constraining innovation activity, and therefore may be a useful focus for policy intervention. In the models, we find that generally our 'barriers' variables are largely insignificant suggesting that in general the operating environment in Ireland and Northern Ireland is relatively conducive to innovation. In particular, we find no evidence that either product or process innovation is being significantly constrained by either skill shortages or shortages of finance, a result which may reflect the relatively high level of public support on offer to plants in Ireland and Northern Ireland for innovation. Instead, the most significant barriers to innovation relate to a perceived lack of partners, which has a negative impact both on the extent of innovation and its success, and regulatory impacts which are reducing plants' sales of new products. More specifically, our results suggest that a lack of partners is reducing the extent of innovation by around 12-13 per cent and innovation success by 10-12 per cent (Table 3). Regulatory barriers are reducing plants' sales of new products by around 7.5 per cent but have no significant impact on plants' sales of new and improved products. This suggests that policy intervention to strengthen innovation partnerships and reduce regulation – particularly relating to new products – may both yield significant innovation benefits.

Our final group of variables relate to plants industry, and while these prove largely insignificant in terms of their impact on the probability of innovating, they have stronger effects on the extent of plants' innovative sales (Table 3). Plants in the more traditional materials-based sectors (i.e. paper, printing, non-metallic minerals) have lower levels of innovative sales (minus 10-12 per cent) than plants in the reference sector (electrical and electronic engineering). This is consistent with slower product turnover –

<sup>12</sup> Separately identifying the selection and assistance effects requires a different estimation approach to that adopted here. See Maddala (1973, pp. 257-290) for a general discussion of the issue and Roper and Hewitt-Dundas (2001).

or longer product lifetimes – in the more traditional sectors (see also Love, Roper, and Du, 2007).

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## 5. Conclusions

Our aim in this paper has been to draw on the unique longitudinal aspect of the Irish Innovation Panel (IIP) to track the innovation performance of manufacturing plants in Ireland and Northern Ireland from 1991 to 2005. This period coincides with a growing emphasis on the promotion of innovation by the industrial development agendas of both Ireland and Northern Ireland backed by substantial public sector investments on both sides of the border. Set against this policy background, and significant economic growth, it is perhaps disappointing that levels of innovative activity in both Ireland and Northern Ireland have not increased more rapidly. In terms of product innovation for example, the proportion of manufacturing plants making product changes has increased only 5 per cent in Ireland and just over 7 per cent in Northern Ireland. The trend is even more disappointing for the proportion of plants undertaking process innovation, with a decline of almost 7 per cent in Ireland. In Northern Ireland a somewhat different trend is found with a 7 per cent increase in the proportion of plants undertaking process change. This relatively static level of innovation activity has recently led to a greater emphasis by the business development agencies in both Ireland and Northern Ireland, i.e. Enterprise Ireland and Invest NI, to target assistance at non-innovating businesses and those with limited previous R&D activity.

For example, the introduction of innovation vouchers in Ireland is targeted specifically at small businesses with the hope that this will lead to a culture shift in the business towards innovation and foster the external innovation links with the academic community. In NI, support initiatives that encourage businesses to engage in R&D and innovation such as Compete, Product and Process Development support and SMART awards have now run for a number of years and while programme evaluations have been positive, cumulatively this has not translated into a substantial increase in the proportion of innovative businesses. This raises issues about the persistence of R&D and innovation activity in businesses. However, again awareness within the development agencies of the importance of sustaining innovation activity is evident in initiatives such as the R&D fund in Ireland aimed at increasing the level, quality and commercialisation of R&D in the context of sustained innovation activity in the business. Similarly, in NI innovation support programmes such as the second phase of the Compete programme or the SMART programme are focused on building innovation capability in projects of strategic benefit to business competitiveness.

During the 1991 to 2005 period our analysis also suggests the vulnerability of innovation activity to more general economic conditions. This was most notable around the millennium with the high-tech downturn causing sharp falls in the level of innovation activity (both product and process) in both Ireland and Northern Ireland and across most sectors and plant size bands. The most marked effects, however, were evident in externally-owned plants operating in high-tech, export oriented sectors. In the period immediately following the economic downturn (i.e. 2003 to 2005), however, there was a marked recovery in innovation activity although the nature of this recovery in Ireland and Northern Ireland seems very different. In Ireland, post-2002 while the proportion of plants introducing product innovations increased there was a continued decline in

process innovation activity. In Northern Ireland, both product and process innovation increased in the post-2002 period such that between 2003 and 2005 Northern Ireland had a higher proportion of plants than in Ireland undertaking process innovation. These trends provide some evidence of convergence in innovation performance between Ireland and Northern Ireland over the 1991 to 2005 period. This is evident in the narrowing gap between the proportion of product innovators in Ireland and Northern Ireland, convergence in the proportion of plants undertaking process innovation and in terms of the increasingly similar proportions of sales derived from innovative products.

Looking in more detail at the determinants of manufacturing innovation re-emphasises the importance of business R&D. This provides a strong justification for the Irish Government's Strategy for Science, Technology and Innovation 2006-2013 in seeking to increase the number of R&D active companies and the level of business investment in R&D to that approaching international levels. External linkages to suppliers and external consultants also prove important for innovation, although other types of innovation linkage – to customers, public knowledge sources and competitors – prove less significant. The suggestion is that plants' innovation activities in Ireland and Northern Ireland are drawing on a relatively narrow range of potential knowledge sources, an impression reinforced by the significant negative effect on innovation of a 'lack of partners'.

With a perceived weakness in the innovation knowledge network, it is encouraging to note in recent years, the introduction in Ireland and Northern Ireland of a range of policy initiatives to promote and support research and innovation networks. Since the end of the period covered by our data – to 2005 – a number of new initiatives have been launched in Ireland to promote greater university-business links. These include the Innovation Voucher Scheme, Competence Centres, the Applied Research Enhancement Programme (ARE) and the Technology Transfer Strengthening Initiative. Although other research has suggested a lack of any significant innovation benefits from plants' links to public knowledge sources such as universities (Jordan and O'Leary, 2007), this may be attributable to a number of factors. These include time lags in the exploitation of university research, the misalignment of research with firms' innovation strategy (Arvanitis and Wörter, 2006) or indeed, such findings may relate to a period when intervention to support knowledge transfer activities was much weaker than at present. Clearly, given the increased emphasis by policy on nurturing university-business collaboration, understanding the dynamics and maximising the return from university-business collaboration in the future will be important.

More generally, other initiatives designed to strengthen R&D collaboration and innovation partnerships and increase knowledge sharing and diffusion are to be welcomed as are measures designed to broker more extensive innovation linkages among private sector actors. Both the Enterprise Ireland R&D Fund for collaborative research and the Growth fund for the acquisition of consultancy services will contribute to strengthening such linkages. However, the portfolio of R&D and innovation measures in both Ireland and Northern Ireland remain less strongly oriented towards embedding a collaborative and systemic innovation culture through greater private sector links.

Our results support the findings of programme evaluations in suggesting that public support for both product and process innovation is having significant positive effects on innovation outputs at the level of the individual plant. This is reassuring given the continuing provision of public support for business R&D and innovation activity both in Ireland and Northern Ireland. An interesting question for future research, however, is why these positive plant-level policy effects are not translating into more significant increases in innovation among the population of firms as a whole. A number of possibilities are evident here. First, it may be that innovation policy effects on individual plants are transient and leave little legacy in terms of longer-term commitment to innovation or innovation capability. Second, other factors linked to the business cycle or other elements of plants' operating environment may be undermining a positive policy effect. Our results, for example, suggest the importance of regulatory barriers for new product success. Third, there may be a tendency for plants to seek public support for particularly risky innovation projects which may be reflected in higher levels of innovation but relatively low average levels of innovation success. Future research using the Irish Innovation Panel is planned around each of these issues.

## Data Annex

Innovation Indicators	Definition	Northern Ireland n=243		Ireland n=562		All Plants n=805	
		Mean	St.Dev.	Mean	St.Dev.	Mean	St.Dev.
Product innovation	Dummy variable taking value 1 if the plant introduced any new or improved product during the previous three years.	0.591	0.492	0.674	0.469	0.643	0.479
Process innovation	Dummy variable taking value 1 if the plant introduced any new or improved process during the previous three years.	0.516	0.500	0.501	0.500	0.507	0.500
Innovation success (new products)	Percentage sales derived from products newly introduced over the previous three years.	13.531	20.549	14.686	21.929	14.252	21.426
Innovation success (new and improved)	Percentage sales derived from products new or improved products introduced over the previous three years.	20.653	26.840	21.964	27.728	21.469	27.400
<b>Knowledge Sourcing</b>							
Research and development	Dummy variable with value 1 if plant is engaged in R&D	0.442	0.497	0.452	0.498	0.448	0.497
Other group members	Dummy variable if plant has innovation links to other group members/plants.	0.163	0.369	0.177	0.382	0.171	0.377
Backwards linkages	Dummy variable with value 1 if plant has linkages to suppliers or consultants	0.290	0.454	0.307	0.461	0.300	0.458
Forwards linkages	Dummy variable with value 1 if plant has linkages to customers	0.203	0.402	0.200	0.400	0.201	0.401
Horizontal linkages	Dummy if plant has innovation links to competitors or joint ventures	0.064	0.245	0.103	0.304	0.088	0.284
Public knowledge sources	Dummy variable with value 1 if plant has links to universities, public labs.	0.193	0.395	0.162	0.368	0.174	0.379
<b>Resource Base</b>							
Employment (2002)	Employment in 2003	52.338	79.130	60.966	100.984	57.778	93.591
Established post-2000	Dummy variable with value 1 if plant established post 2000	0.033	0.178	0.077	0.267	0.061	0.239
Externally-owned firm	Dummy variable with value 1 if firm owned outside Ireland	0.225	0.418	0.244	0.430	0.237	0.425

Part of multi-plant group	Dummy variable with value 1 if plant is part of multi-plant group	0.270	0.444	0.341	0.474	0.314	0.464
Important group R&D	Dummy variable with value 1 if R&D relevant to the plant is undertaken elsewhere in the group	0.142	0.349	0.184	0.388	0.168	0.374
Graduates in the workforce (%)	Percentage of the workforce which are graduates	10.514	11.893	11.986	16.131	11.433	14.699
<b>Barriers to Innovation</b>							
Risk of investment		0.445	0.497	0.481	0.500	0.467	0.499
Low rate of return		0.508	0.500	0.471	0.499	0.485	0.500
Attitudinal barriers in plant		0.406	0.491	0.395	0.489	0.399	0.490
Lack financial resources		0.512	0.500	0.458	0.498	0.478	0.500
Lack information		0.402	0.490	0.388	0.487	0.393	0.489
Regulatory barriers		0.496	0.500	0.411	0.492	0.443	0.497
Lack partners		0.335	0.472	0.337	0.473	0.336	0.472
Technical skill barriers	Originally Likert indices. Recoded into dummy variables taking value 1 if the barrier was 'important' or 'very important'.	0.427	0.495	0.414	0.493	0.419	0.493
Managerial skill barriers		0.412	0.492	0.380	0.486	0.392	0.488
<b>Government Assistance</b>	Dummy variable taking value 1 if the plant received government support for product innovation	0.242	0.429	0.170	0.376	0.197	0.398
<b>Industry Dummies</b>							
Food and textiles	Dummy variable for Nace 15-19	0.183	0.387	0.216	0.411	0.203	0.403
Materials based industry	Dummy variable for Nace 20-26, 36-37	0.276	0.447	0.350	0.477	0.322	0.467
Machinery and equipment	Dummy variable for Nace 27-29	0.224	0.417	0.202	0.402	0.210	0.408
<b>Northern Ireland</b>	Dummy variable for Northern Ireland plant	1.000	0.000	0.000	0.000	0.373	0.484

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Year	Author(s)	Title	Issue	Pages
2008	Frank Barry and Chris Van Egeraat	The Decline of the Computer Hardware Sector: How Ireland Adjusted	Spring	38-55
2007	Alan Barrett and Yvonne McCarthy	The Earnings of Immigrants in Ireland: Results from the 2005 EU Survey of Income and Living Conditions	Winter	42-62
	Sean D. Barrett	Hub Airport Slots, Market Exit and Irish Regional Economic Development	Winter	63-79
	Martin O' Brien	Building for the Future? Interpreting an "Irish" Current Account Deficit	Winter	80-103
	Richard S.J. Tol	Irish Climate Policy for 2012: An Assessment	Winter	104-117
	Vincent Hogan and Pat O'Sullivan	Consumption and House Prices in Ireland	Autumn	46-61
	Seán Lyons, John Fitz Gerald, Niamh McCarthy, Laura Malaguzzi Valeri and Richard S.J. Tol	Preserving Electricity Market Efficiency While Closing Ireland's Capacity Gap	Autumn	62-82
	Colm McCarthy	Owner-Occupied Housing Costs and Bias in the Irish Consumer Price Index	Autumn	83-98
	Morgan Kelly	On the Likely Extent of Falls in Irish House Prices	Summer	42-54
	Shane Whelan	Valuing Ireland's Pension System	Summer	55-80
	Patrick Massey	Delayed Indefinitely: Regulatory Reform of the Irish Bus Industry	Spring	68-61
	William K. Roche	Developments in Industrial Relations and Human Resource Management in Ireland	Spring	62-77

<b>Year</b>	<b>Author(s)</b>	<b>Title</b>	<b>Issue</b>	<b>Pages</b>
	Iulia Traistaru-Siedschlag	Macroeconomic Adjustment in Ireland under the EMU	Spring	78-92
<b>2006</b>	Sean D. Barrett	Evaluating <i>Transport 21</i> – Some Economic Aspects	Winter	36-58
	Patrick Honohan	To What Extent Has Finance Been a Driver of Ireland's Economic Success?	Winter	59-72
	Laura Malaguzzi Valeri and Richard S.J. Tol	Electricity Shortages in Ireland: Probability and Consequences	Winter	73-79
	Laura Malaguzzi Valeri	Comparison of Electricity Deregulation Around the World and Implications for Ireland	Autumn	38-63
	Philip J. O'Connell and Helen Russell	Does it Pay to Go Public? Public/Private Wage Differences Among Recent Graduates in Ireland	Autumn	64-79
	Brendan M. Walsh	Labour Market Adjustment in the Irish Regions, 1988-2005	Autumn	80-99
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	Janine Dixon and Alan Matthews	Impact of the 2003 Mid-Term Review of the Common Agricultural Policy	Spring	36-52
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	Tim Callan, John Walsh and Kieran Coleman	Budget 2006: Impact on Income Distribution and Relative Income Poverty	Winter	59-64
	Anne Ribault-O'Reilly	A Review of the Regulatory Environment for Bus Transport in Ireland	Winter	65-76
	John Lawlor Colm McCarthy	Alternative Seasonal Adjustment Methods for Aggregate Irish Macroeconomic Data	Autumn	34-54

<b>Year</b>	<b>Author(s)</b>	<b>Title</b>	<b>Issue</b>	<b>Pages</b>
	John Lawlor Colm McCarthy	Alternative Seasonal Adjustment Methods for Aggregate Irish Macroeconomic Data	Autumn	34-54
	Shane Garrett	The <i>Quarterly Economic Commentary</i> Forecasting Record 1994 to 2004	Autumn	55-62
	J. Jerome Casey	Improving Irish Bus Markets: But Not by Competition Alone	Summer	36-50
	Marc Coleman	Stability Pact Reform: A Look at “What Might Have Been”	Summer	51-68
	Helena Lenihan, Mark Hart and Stephen Roper	Developing an Evaluative Framework for Industrial Policy in Ireland: Fulfilling the Audit Train or an Aid to Policy Development?	Summer	69-85
	Declan Jordan and Eoin O’Leary	The Roles of Interaction and Proximity for Innovation by Irish High-Technology Businesses: Policy Implications	Summer	86-100
	John Fitz Gerald	The Irish Housing Stock: Growth in Number of Vacant Dwelling	Spring	42-63